The Iron Age

A Review of the Hardware and Metal Trades.

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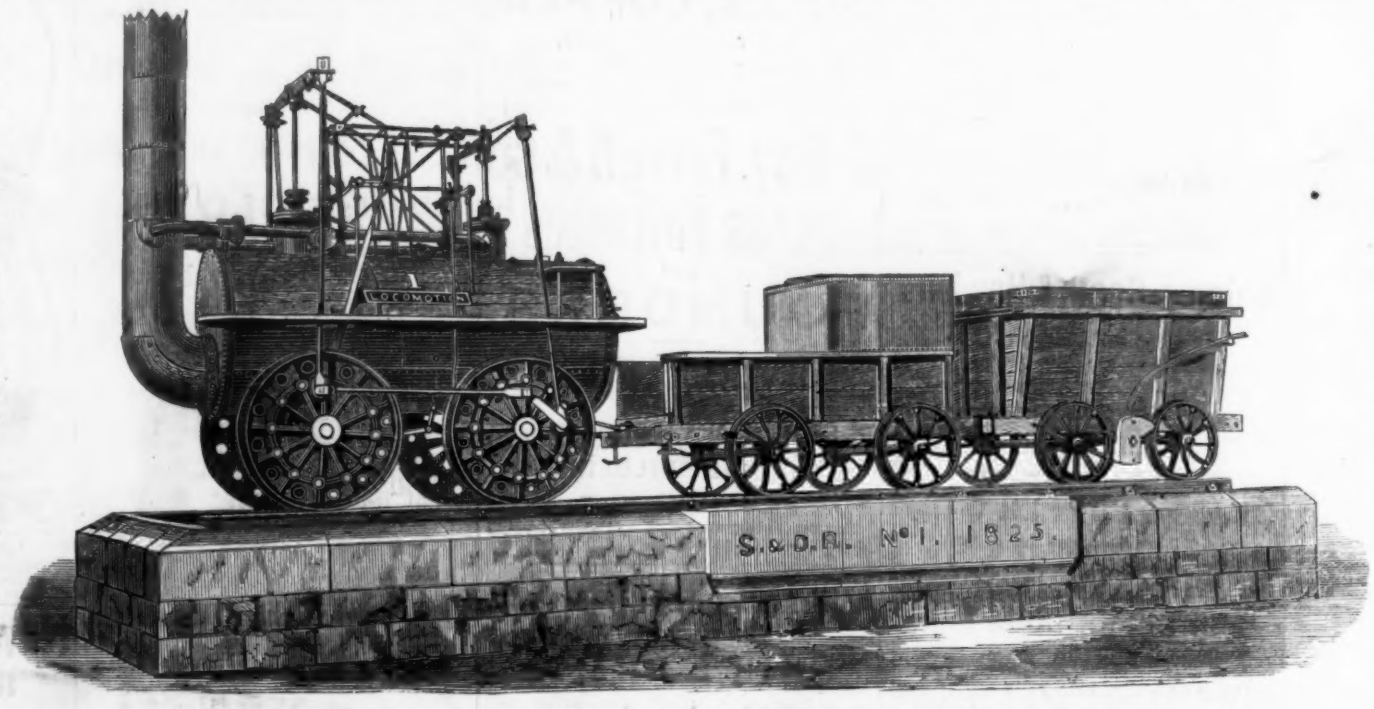
First English Passenger Locomotive.

In an article on this subject in the December number of the *National Car Builder*, we borrow the accompanying illustration of the earliest of the English passenger engines. The *Car Builder* says:

"The engraving represents the locomotive and tender wagons used in hauling the first train of cars over the Stockton and Darlington Railroad, in England, fifty years ago. The train consisted of a number of coal, merchandise and passenger wagons, and ran over the track at the very moderate speed of eight miles an hour. The event, as our readers are aware, has recently been celebrated with much enthusiasm as the practical inauguration of the great railroad system of the world. The locomotive and wagons, as represented in the cut, have been placed upon a massive pedestal, as a monument to indicate the rude germ which has since expanded into such amazing development.

"The plain, straight boiler, 10 feet in length by 4 in diameter, has a single flue and 60 square feet of heating surface. The safety valve lifted at 25 pounds pressure. Above the generator are two cylinders, 10 inches in length by 21 inches stroke, their pistons working cross beams which were coupled to the connecting rods, which in turn rotated the wheels. A loose eccentric sheave and bell cranks operated the flat slide valves; and from a crosshead on the piston rod, the pump was worked. Add a wooden framework, no brakes, a little tender capable of holding 240 gallons of water, and the picture of the machine which annihilated the pet theories of the majority of the skilled engineers of its day, is complete.

"The ludicrous contrast between this comparatively clumsy and diminutive machine, and the ponderous and powerful locomotives of the present day, can be seen at a glance by every one who is familiar with the construction and capacities of the latter, a contrast that is fairly exemplified in the speed of eight miles per hour as compared with sixty miles."



THE FIRST PASSENGER LOCOMOTIVE.

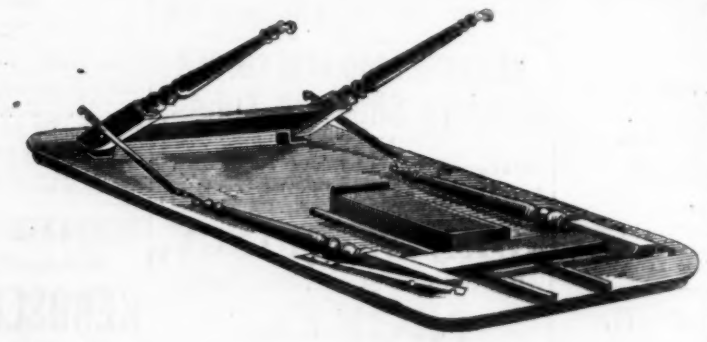
One of those who was present at the Darlington exhibition gives the following account of this old engine and the way she worked:

"The great center of attraction was the Locomotion. The old engine had been mounted on baulks of timber with the wheels clear of the rails; the pistons had been drawn and packed, the gear is generally cleaned up, tightened and put in order, the glands packed, and steam was led to the cylinders—not to the boiler—by a pipe, and so the wheels once more revolved under the influence of steam. How many years have elapsed since steam was in these cylinders before we cannot say, but the engine turned round freely, and the curious action of the parallel motion gear could be seen; and so the old locomotive, the Adam of passenger engines lived once more. A similar engine, the Hope, built about the same time, was broken up long since. It is not remarkable that this engine attracted the attention of qualified engineers, but the interest taken in its performance by the good people of Darlington was apparently much deeper. They were never tired of examining her. They came back again and again, and we heard not one disparaging remark concerning the workmanship, but many an encomium from the older men, who probably remembered something of her performances."

The workmanship of these early engines must have been wonderfully good, for, in looking at a list of them, we find that many of them continued in use until very recent dates, and, if we are not mistaken, some are still at work.

Maires' Patent Folding Table.

Folding tables of various kinds have been in the market for some time, in competition with the ordinary lap or cutting board, but, owing to weak and flimsy construction, bad design and high price, they have not met with a very general sale. The folding table is, however, a very desirable convenience. Its importance may be seen from the fact that some fifty different styles have been patented. The table which we illustrate is the result of an attempt to combine convenience and portability when folded, steadiness when open, and at the same time to make the cost small. The difficulties are apparently met and overcome in this table, which is manufactured by Mr. John Maires, of Troy, N. Y. When folded it will be seen that the table takes up very little space, a very desirable thing where it is necessary to economize room. When folded its parts are held in place by four springs which, when the table is open, act as braces, and keep it regularly or quite as firm as an ordinary table of the same weight. There is a large drawer beneath the table, kept securely closed when the table is folded, and upon the top is a yard measure divided into feet and inches. These tables are made up in three regular styles, the best being of black walnut at $4·00, the cheapest at $2·50. Beside these regular kinds Mr. Maires makes any size and style of this table to order, adapting it to any particular kind of work.



MAIRES' PATENT FOLDING TABLE.

Specifications.

In the course of his introductory lecture in opening the Engineering Classes of Glasgow University, Professor Jas. Thomson made the following remarks: Mathematics and natural philosophy are two of the most important elements in an engineering scientific education; but they are not all that is wanted. In by far the larger proportion of cases in which important action must be taken a rough-and-ready decision is all that is wanted, or, at any rate, is all that is possible. If, however, the engineer or architect is well prepared with scientific principles to aid his judgment—if he is intimately acquainted with the physical properties of materials—if he is accustomed to take a comprehensive view of the relations and mutual influences of the different parts of structures in numerous and varied cases, with the aid of exact mathematical investigations in cases where mathematics may be truly applicable—and if, too, his mind is amply stored with practical knowledge and experience, his decisions are likely to have more of the ready and less of the rough in their character. Mathematical investigations exact and, it may be, complicated, and involving refined and delicate physical considerations, have often very important practical uses in engineering, in architecture and in naval construction. To you, as students in this university, there is no danger of the importance of these subjects passing unnoticed and unknown; but there is a danger of quite another kind, against which a timely warning given may be of vital consequence. It is the danger of being misled by bad advice, or bad usages, into neglecting to make efforts, with due vigor and determination, to have your designs complete, or as complete as they may, or can, or ought to be, before you will draw your client on, or allow him to go forward into having the execution of them proceeded with. In so far as you allow your plans, in a state in which you ought better than any one else to know that they are incomplete and immature, to be begun and proceeded with in execution, you are laying up vexations for all concerned—losses and disappointments for your employer, and therefore grief for yourself. Now I have to tell you that the designs for the execution of any important piece of work, and even for the execution of pieces of work of minor importance, in almost all cases cannot be completely made and completely exhibited by drawings alone. It is necessary, also, in each case for the designer to write out a specification of various particulars to be attended to in the execution of the work. The nature and scope of a specification for the execution of works must depend on the manner in which it is intended that the work shall be carried out; but, in any case, it ought at least to contain clear explanations of many things which the drawings alone do not fully exhibit, and perhaps even could not be made completely to indicate. While an architect or an engineer is proceeding with the making out of drawings for any projected work, he ought constantly to keep at hand a set of sheets of paper on which to jot down his notes for a specification; because, during the attempts to perfect the drawings many things are likely to be thought of which ought to be distinctly stated as written instructions for the builder or maker, but which, if not noted at the time, may be liable to be afterward overlooked and forgotten. Then, when the drawings are complete, or are supposed to be nearly so, the time comes for writing out a specification in all its desirable completeness. The primary and main object of a specification may be briefly described as being to give, fully and clearly, all necessary and useful written explanations and instructions for the execution of the work; and, in the case of works to be executed by contract, for making due preparations for the effecting of a definite and clear bargain between the contractor offering to execute the work and the person or company accepting his offer. But, while this is the primary and main object, there are two incidental objects of no trivial importance, which I shall now mention: Firstly, the specification, when submitted to the person or company for whom the work is to be done, affords the best possible means for understanding the drawings, and for judging on many points in the proposed scheme, which, though perhaps of great importance, would otherwise have escaped notice; and, secondly, the requirement for a good and clear specification involves this most important condition with the architect or engineer himself—that, in fact, he cannot draw it up at all without first finding out what the design or work is that he wants to specify definitely, and what parts of his project must considerately be left unsettled and open for future decision. When he applies himself with earnest determination to draw up a specification well, he can scarcely let much pass unnoticed by mere inadvertence, as he is quite apt to do when he proceeds without a specification. I have been led to make these remarks because I have learned that a practice is adopted and worked upon by many architects—worked upon very generally in the profession, it has been from various quarters strongly asserted, but I will not believe in the imputation as applied to the profession generally—a practice, namely, of giving the instructions to the builders by drawings insufficient to exhibit the work at all completely, and by what are called bills of quantities, and of arranging the bargains by means of "priced lists," but without any writing whatever of the nature of a specification. What, then, is the obstacle that leads into the omission of this all important means toward the complete exhibition of a design? It is, ordinarily, just this—that the designs themselves have neither been fully delineated on paper in the drawings, nor have been formed with sufficient completeness in any human brain. When work is begun in this way, things sometimes go forward at first with great ease and satisfaction; each person is relying upon the others, and even the architect himself has not distinctly realized how incomplete the designs and instruction he has given really are. But soon a time arrives when difficulties begin to show themselves. Some things are found to be ill arranged in their relations to other things; some things essential to be contrived have been unnoticed or forgotten altogether; the builders have to spend much valuable time that ought not to have been required in calling at the office of the architect to ask what they are to do next, or how they are to proceed with some part of the work already begun or far advanced, but in respect to which some alteration of plan is contemplated, but not yet arranged or decided on. Troubles and anxieties proceed; but now I will draw the curtain over my unfinished picture of the consequences of proceeding to the execution of important works without a specification.

The Price of Boiling in Pittsburgh.

The *American Manufacturer* of the 2d inst. says:

On last Friday evening the manufacturers and boilers met according to adjournment to confer relative to the price of boiling in this city for the winter. It will be remembered that four weeks ago, at a conference, the price for boiling was fixed temporarily at $5 per ton, and the meeting adjourned with the understanding that both parties were to get information as to the price paid in the East for boiling iron, this price being in dispute between them.

The report of the results presented showed that something like 100 mills had been heard from, but all rail mills, except those that made merchant iron also, were excluded, as were all mills that were idle or were stopped by reason of labor difficulties. This left 57 mills, and at these the average price for boiling, including what was paid from the office, and making no allowance for charcoal iron, was $4·45, and for puddling $3·91. The highest price paid for boiling was $5·40, including 15 cents per ton from office, but this was all charcoal iron, which, according to the practice in this city, is worth $1 per ton more than common iron. At the mills paying this price the men have been notified that they must accept a reduction. The table also showed that one mill in Philadelphia was still paying $5·50, but this has been reduced to $5, and will be still further reduced. The lowest price for boiling was at a New England mill—$3·83, with no extras. The highest price for puddling was $4·50. This was for all charcoal iron for plates. The lowest price for puddling was $3·50.

As to the correctness of these prices we can vouch. There has been an endeavor to weaken the force of these figures by asserting that Eastern iron was inferior. If by this it is meant that Eastern pig is inferior, then boiling and puddling should be higher in the East, as it is much more difficult to work poor iron than to work good. If this is not the point, then it isn't worth a cent as an argument, as it is with pig that the puddlers have to do.

Nothing was accomplished at the meeting, and an adjournment was had until Tuesday, Dec. 7th. What the result will be it is impossible to even guess. We do not believe that the manufacturers will pay one cent above the price they offered, $4·50, for the simple reason that they cannot afford to do so. At present prices there is not a manufacturer in the city getting back the money he puts into his iron, and it will be folly for him to run this winter. Indeed, it is a question worthy of the most serious consideration, whether it is not better to stop entirely. There is so much iron pressing the market that the price will be kept down until the consumptive demand increases.

The whaling fleet from New Bedford, Mass., this season numbers 50 vessels, nearly every whaler that has come home during the year having been immediately refitted, and the fleet having done well everywhere, with a number of exceptionally good catches, the average catch of the season being 1350 barrels of whale oil per vessel. There are in port now only 10 whalers, including one ship, seven barks and two schooners. The report from San Francisco gives the catch of whale oil there at half a million of dollars. The whole whale fleet does not exceed 200 vessels, against a fleet of a thousand vessels 40 years ago. Nevertheless the business seems to be recuperating from the disastrous prostration caused by the deluge of the oil markets of the world with Pennsylvania petroleum, and the terrible losses in the Arctic seas. Perhaps the great falling off in the number of whalers has allowed the whales time to breed again, for toward the last few years before the petroleum mania the excessive slaughter of whales had rendered the fisheries precarious and unprofitable. They are no longer regarded as of much value as nurseries for seamen, the sharp practice of the skippers having driven all valuable sailors out of the service and filled it up with the riff-raff of all nations and all climes. Scarcely any good sailor who has any respect for himself will now continue long in any of the New England whalers.

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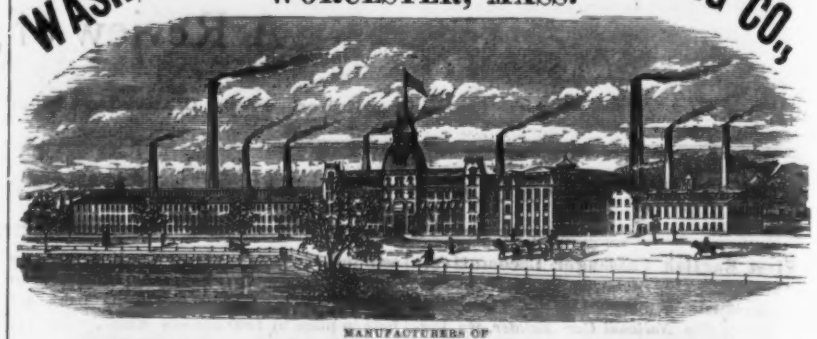

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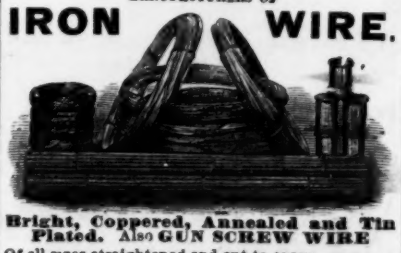

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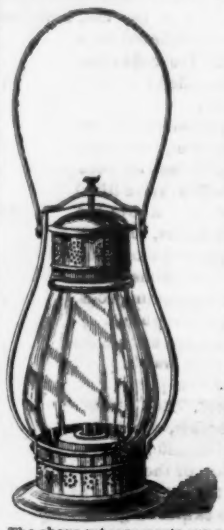

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The Legality of a Coal Combination.

Arguments were heard, on the 27th ult., by the Supreme Court of the State of Pennsylvania, relative to the granting of a preliminary injunction in an important suit of which the following is a synopsis:

H. L. CAKE, ET AL. *vs.* PHILADELPHIA COAL COMPANY, ET AL.

The complainants first aver the fact that the Philadelphia Coal Company and the Green Land Company were chartered, giving dates, and then stated that on the 28th of May, 1874, said companies entered into a written contract with each other, in which complainants were interested as parties of the one part. The Philadelphia Coal Company owned and operated three valuable collieries in this county, working the Mammoth Vein. Before the contract previously mentioned was entered into, the Philadelphia Coal Company was governed and managed by a board of five directors, viz: Geo. W. Huntzinger, Henry L. Cake, G. Dawson Coleman, Jacob Huntzinger and David P. Brown. Up to and prior to reducing the aforesaid contract to writing, the verbal agreement and terms of Cake and G. W. Huntzinger in relation to the sale of a portion of their stock in the Philadelphia Coal Company, were with the Lehigh Valley Railroad Company, the negotiations were with the officers of that company, and the consideration for said stock was to have been paid and was paid by the Lehigh Valley Railroad Company; and it wasn't until the contract was being reduced to writing that complainants first heard of the Green Land Company and the desire of the Lehigh Valley Railroad Company that the Green Land Company should be a party to the contract in their stead. The verbal agreement was for the sale of 17,500 shares of the capital stock of the Philadelphia Coal Company, but when it came to writing the contract of the Green Land Company demanded sufficient stock to give them control of the board of directors. So four additional shares of stock were transferred to them and a contract entered into. On the 3d of June, 1874, Jacob Huntzinger resigned his position as director, and later in the same month H. L. Cake, G. W. Huntzinger, Asa Packer, Israel W. Morris and Geo. B. Markle were elected directors of the Philadelphia Coal Company, the last three being designated by virtue of the contract. So the Philadelphia Coal Company passed under the management of the Green Land Company, 17,504 shares of stock being vested in that corporation and 17,496 shares in the complainants.

In the leases granted to the Philadelphia Coal Company by the city of Philadelphia, trustees under the will of Stephen Girard, it was stipulated that "the lessees shall and will work the mines *bona fide*, continuously, and with all due dilligence, to the same extent that mines of the same capacity are usually worked, taking into consideration the season of the year, the demand for coal, and the facilities for transportion of it to market." By the terms of the leases as well as by the true intent of the contract made it was incumbent on the present management as the Philadelphia Coal Company to work the three collieries *bona fide*, continuously, and with all due dilligence, to the same extent that mines of the same capacity are usually worked;" both to comply with the leases and for the profit of the stockholders. The collieries, it is alleged, can only lie idle at the risk of great and serious damages.

We come now to that portion of the case of most interest and which justifies the statement that it arises directly from the long strike. After stating that Morris and Packer were directors of the Green Land Company, at the time they were directors of the Philadelphia Coal Company; that G. B. Markle was a stockholder in the Lehigh Railroad Company, a corporation asserted to be the principal owner of stock in the Green Land Company, and that Asa Packer was, and is, a large, if not the largest, stockholder in the Lehigh Valley Railroad Company, the complainants go on to say:

"That a short time before the first day of January last, an unlawful combination, confederacy and agreement was entered into by and between certain corporations, including the Wilkesbarre Coal and Iron Company, the Pennsylvania Coal Company, the Delaware, Lackawanna and Western Railroad Company, together with other railroad and coal companies, who, together, owned over 200,000 acres of anthracite coal land, the same being nearly the entire body of such coal lands in the state of Pennsylvania and of the world, as well as most of the outlets to market therefrom, whereby the said corporations were enabled to control the cost of production and the prices of coal in such an arbitrary manner as would enable them to oppress the consumers of coal and subject the miners and laborers about the mines to such reduced rates of wages as they might dictate. That such combined companies owned and controlled not less than $200,000,000 in value in anthracite coal lands, railroads, and their appurtenances. That said corporations, owning and possessing such a vast amount of capital, and possessed with extraordinary powers, sought by such combination, confederacy and agreement together to act as a unit in the control of the prices of coal and the cost of production as aforesaid. That the said corporation so unlawfully combining, confederating and agreeing together, had, among other things, the object and purpose of reducing the wages of the miners and laborers working in and about the coal mines in the whole of the anthracite coal lands aforesaid. That the said Lehigh Valley Railroad Company is also a large owner, directly or indirectly, through other corporations whose stock it owns, including that of the Green Land Company as aforesaid, in said anthracite coal lands, amounting to many thousands of acres. That in the said unlawful combination, confederacy and agreement, the said Lehigh Valley Railroad Company, the Green Land Company, and the said Israel W. Morris, Asa Packer, and George B. Markle were sympathizers, aiders and supporters."

The result of this combination was to suspend mining operations in the anthracite fields, stopping, among others, the collieries of the Philadelphia Coal Company. This stoppage was against the consent and remonstrance of the complainants, who urged that the men should be paid the wages they demanded and the collieries run full handed. In consequence of the stoppage, which lasted from the 1st of January until June 20, an opportunity to mine, ship and sell 150,000 tons of coal was lost. A profit of $2 a ton could have been made on this coal. Thus $300,000 was lost. The complainants also state that by the stoppage the mines of the Philadelphia Coal Company were damaged at least $100,000. Morris, Markle and Packer, it is claimed, have become liable to pay to the Philadelphia Coal Company $400,000, loss of profits and damages to the mines.

The complainants "further aver and say, that the said the Green Land Company, upon the claim that the profits of the said the Philadelphia Coal Company, for the year ending June 1st, 1875, have not been sufficient to pay the amount of profits to accrue to the said the Philadelphia Coal Company, according to the guarantee and undertakings of said complainants in said contract, threaten to sell a portion of the collaterals received from the said complainants, viz: So many of the bonds of the Lehigh Valley Railroad Co., held as collateral security as aforesaid, as may be necessary to make up the sum of $108,769·15, with interest from the first day of June last, on the 30th day of November, A. D., 1875, at the Merchant's Exchange, in the city of Philadelphia, at 12 o'clock noon, by M. Thomas & Sons, auctioneers."

Upon this showing, the complainants ask the Court to grant a preliminary injunction to restrain Thomas & Sons from disposing of the bonds on the 30th of November, and to restrain the Green Land Company "from selling or otherwise disposing of all or any portion of said bonds, either at public or private sale, at any other time or place, contrary to the consent and agreement of the said complainants;" also to order an account between complainants and defendants, the latter to be charged with the loss of profits and damages mentioned before; also to declare null and void the contract "made between the said complainants of the first part and the said the Green Land Company of the second part, or such parts thereof as may be determined by this Honorable Court, are *ultra vires*, and beyond the legal authority of the said the Green Land Company to make and enter into;" and also that the Court "shall further order and decree that the said $200,000 of the bonds of the said the Lehigh Valley Railroad Company, and said 17,504 shares of stock in the said the Philadelphia Coal Company, held by the Green Land Company, and belonging to these complainants as aforesaid, shall be surrendered and delivered up to the said complainants."

Postal Facts and Figures.

The annual report of the Postmaster-General shows that the receipts of the department from all sources for the fiscal year were $27,441,360, and the expenditures $33,611,309. During the year 307 persons were arrested charged with various violations of the postal laws, the greater portion of whom were not connected with the postal service. The money order department, the annual transactions of which have reached about $80,000,000, shows an apparent profit of about $120,000, though it is really in arrears more than that sum, if the clerk hire and stationary required for the business, and now charged against the postal revenues, were transferred to this account, where they properly belong. The department pays the railroad companies for transportation of the mails about $10,000,000 annually. The postmaster general argues that our ocean mails should be carried by American steamships. He says: "The fact that but one line of steamships carrying our flag is employed in conveying mails across the Atlantic and none whatever to South America, is humiliating to the just pride of every American citizen. As a matter of national pride, as an aid to the revenue of American commerce, and as a means of supplying an efficient steam marine, available for immediate use by the government in case of war, provision should be made for the transportation of our mails on important ocean routes, in steamships officered and manned by our own citizens and sailing under our own flag. It is believed that the payment of a moderate mail compensation in excess of the postages now allowed under the provisions of the general law would enable our citizens to establish and maintain steamship lines across the Atlantic and to South American ports which would prove remunerative to the proprietors and promote the general prosperity of the country. A reasonable allowance for a line to the west coast of South America would assure regular mail communications by American steamers with our sister republics on that coast; and a moderate mail compensation for a line to Japan and China will doubtless continue the mail service to those countries in American ships after the termination of the existing subsidy contract, which will expire on the 31st of December, 1876. I think it safe to say that the sum of $500,000 per annum, now granted as a subsidy to the China and Japan line for a single monthly service on that route, would, in addition to the postages on the mails conveyed, be quite sufficient, judiciously apportioned between the respective routes, to maintain an efficient mail service by steamers sailing under our flag on all the important ocean routes which should be occupied by American steamers."

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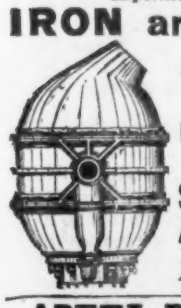
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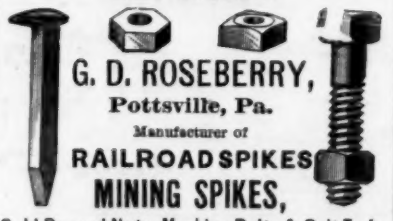
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New Patents.

We take from the records of the Patent Office at Washington the following specifications of certain patents lately issued, which will be found interesting:

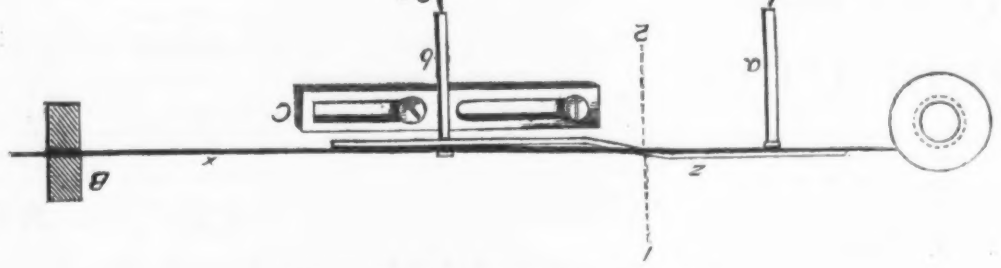
IMPROVEMENT IN ANNEALING METALS.

Specification forming part of Letters Patent No. 169,320, dated October 26, 1875, issued to Joseph H. Warrington, of Camden, N. J.

The object of this invention is to soften or temper wire or other thin metal strips, by causing currents of electricity to impart the heat required; the application to wire drawing apparatus being represented in the accompanying drawing, in which Figure 1 is a plan view of an apparatus for softening wire during the operation of drawing the same; and Fig. 2 a vertical section on the line 1 2, Fig. 1.

A represents a reel of wire, and B a draw plate.

Owing to the condensation and consequent hardening of the metal, it is necessary, after the wire has passed through one or more draw plates, to anneal it, for which purpose it is customary to anneal the coil by the usual process of first heating and then slowly cooling. To avoid this tedious operation the wire is heated, while it is passing through the drawing machine, by an electric current, transmitted through the wire between two fixed poles, in contact with which the wire passes as it is being drawn. These poles consist of a pair of insulated metal bars, *a b*, arranged between the draw plate and the reel, and possessing a slight elasticity, which maintains them in contact with the wire; and to these bars are connected wires *w y*, attached to the opposite poles of a battery, or other galvanic or electric apparatus.



IMPROVED APPARATUS FOR ANNEALING WIRE.—*Fig.* 1.

That portion of the wire between the bars *a b* will serve to conduct from one bar to the other a current, which will impart to this portion of the wire a temperature varying with the intensity of the current; and, as the wire is in constant motion, and in contact with the bars, it must necessarily be heated and softened before it reaches the draw plate, thereby obviating the necessity of annealing the coils of wire from time to time.

In wire drawing it is usual to place on one bench or frame a succession or series of reels, draw plates, and drawing mechanism, in which case one battery may be used in connection with the different drawing appliances.

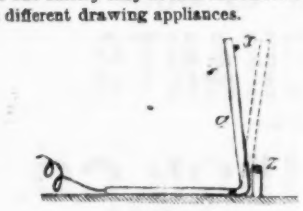


Fig. 2.

It is important that the temporary disuse of one drawing machine should not disturb the action of the electric current in the others. In order to provide for this the wire is made to pass from the reel in an indirect course, the wire passing on one side of the bar *a* and on the opposite side of the bar *b*, and the tension on the wire tends to maintain both bars free from contact with a rod, Z. Should the wire break, however, or the drawing mechanism be out of use, both bars *a* and *b* will, owing to their elasticity, be brought in contact with the rod Z, which will carry off the electric current without disturbing those currents which are employed in connection with other drawing machines.

Either or both of the bars *a* and *b* may be secured to an adjustable plate, C, or may be made otherwise adjustable, so as to regulate the distance between the bars, as the intensity of the current or the thickness of the wire may require.

Although the invention is described as applied to the softening or annealing of wire in wire-drawing apparatus, it may be employed in tempering thin strips of metal, or in apparatus for hardening wires or strips of steel, such, for instance, as umbrella ribs.

Claim.—1. The process of tempering or softening wire or other strips of metal, by subjecting the same to the influence of an electric or galvanic current.

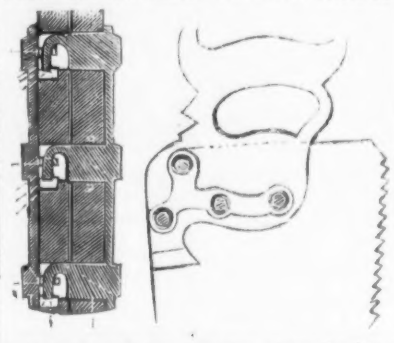
2. The mode of heating continuous wires or strips of metal, by traversing the same in contact with bars *a b*, from one to the other of which an electric current is passed through the said wire or strip, and between which the latter is heated.

3. The combination, in wire-drawing, of the elastic bars *a* and *b*, connected to a battery, with the rod Z.

We take the following abstract of new patents, recently issued, from the official record:

TOOL HANDLE.

To Thomas J. Close, Philadelphia, Pa.—The blade is attached to the handle by means of two clamping plates, one of which is provided with hooks, and the other with eyes. The blade is fastened in place by passing the hooks through suitable openings in the handle and blade, and placing the eyes upon the other plate in line to receive the longitudinal part of the hooks, when, by striking the bottom of the eye plate with a suitable implement, the plates will be drawn together. The blade can be readily detached by a blow upon the top of said plate. The tool handle and blade herein described, secured by clamping plates having a drawing connection.



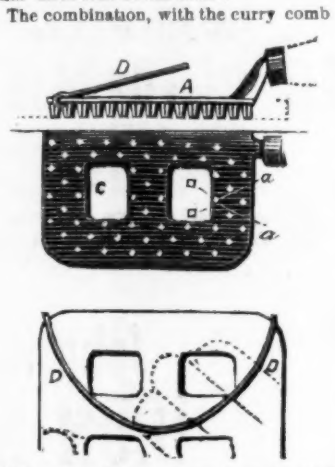
CURRY COMB.

To Robt. F. Walsh, Philadelphia, Pa.—The teeth are blunt, with angle sides, which sides are diagonal to the sides and ends of the comb. A holdback on the far end is grasped by the fingers, while the thumb engages under the tang.

1. The curry comb provided with teeth, each tooth having a series of scraping faces *a a*.

2. The teeth C, having their scraping faces *a* extend diagonally to the transverse and longitudinal directions of the comb.

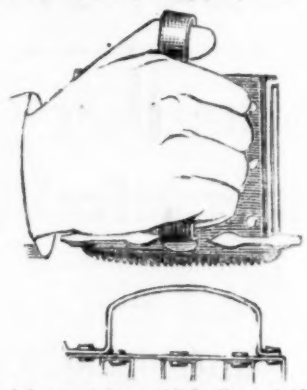
3. The combination, with the curry comb of



a holdback, consisting of the loop D attached to the front end thereof.

CURRY COMB.

To C. A. Hotchkiss, Bridgeport, Conn.—The

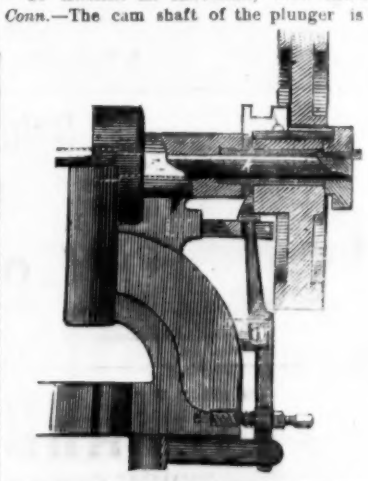


back of the comb is provided with a rigid bail or handle for the fingers to grasp, and the side has a ring for the thumb to enter.

The curry comb provided with a rigid metallic handle on its back, and a thumb-rest.

PUNCH PRESS.

To Alanson H. Merriman, West Meriden, Conn.—The cam shaft of the plunger is entirely freed from the friction of the balance wheel when unclutched therefrom.



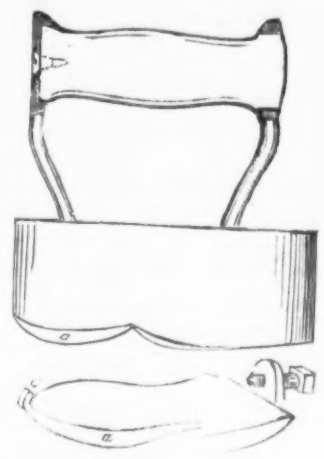
A stationary bearing upon the horn of a press.

SAD IRON.

To Thomas D. West, Cleveland, Ohio.—The iron has polishing surfaces of different forms, and a handle held in sockets on the standards.

1. A combined sad and polishing iron, provided with the ironing surface D and polishing or burnishing points *a b* upon its under face.

2. The combined sad and polishing iron herein described, having its bottom face provided both with ironing and polishing surfaces, the



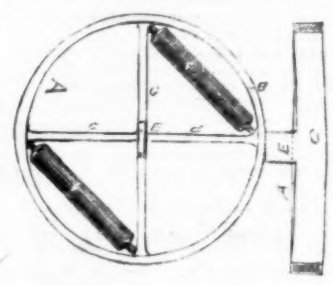
ironing surface D being formed on a plane at at angle to the plane of the burnishing points *a b*.

3. The removable handle consisting of the combination of one arm provided with a ring formation, the other arm flat at the top, and provided with a recess for embracing the handle, and a screw, *b*, with the wooden handle B.

REST FOR HARDENING AND TEMPERING CIRCULAR SAWS.

To Anthony Schulte, St. Louis, Mo.—The saw is placed on the frame and run into the furnace. The frame or support turns upon its pivot, and the saw is equally heated above and below.

1. The combination of the rim B, arms C C C C, post E, and pivot D.



2. The combination of the arms C C C C, post E, and pivot D.

3. The combination of the arms C C C C, rim B, and post E.

4. The combination of the arms C C C C, pivot D, and rollers F F.

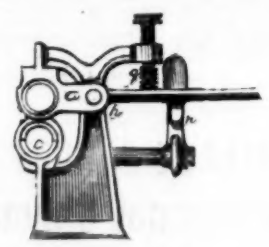
5. The combination of the rim B and rollers F F.

6. The combination of the arms C C C C and rollers F F.

7. The combination of the rim B, arms C C C C, rollers F F, pivot D, and post E.

FLUTING MACHINE.

To H. Albrecht, Philadelphia, Pa.—1. The combination in a fluting machine of a lower fluting roller, supported at both ends by bearings, with

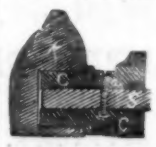


an upper fluting roller, having bearings at one end only.

2. The combination of the upper fluting roller D', with the pivoted frame G, and its two bearings, *d' d'*, adapted to the journal of the said roller.

PROCESS OF MANUFACTURING PORCELAIN DOOR KNOBS.

To Nicholas Boch, Brooklyn, N. Y.—The mode or process of manufacturing porcelain door knobs, by forming or molding the knob and its shank separately, and uniting or cementing them together in the process of enameling by the fluxing of the material used for enameling.



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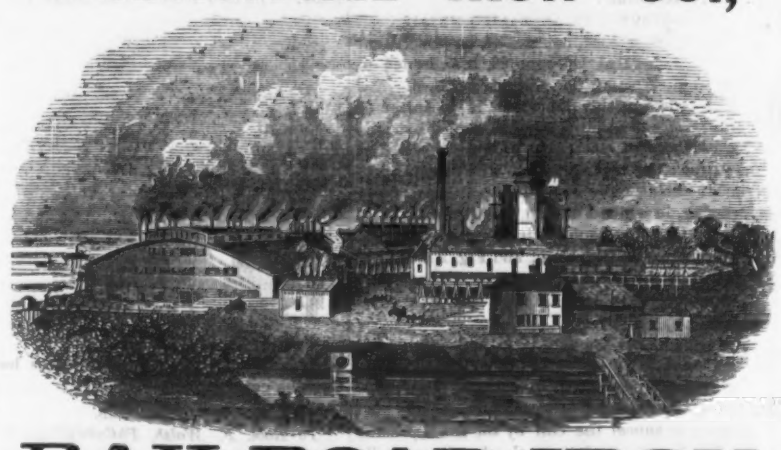

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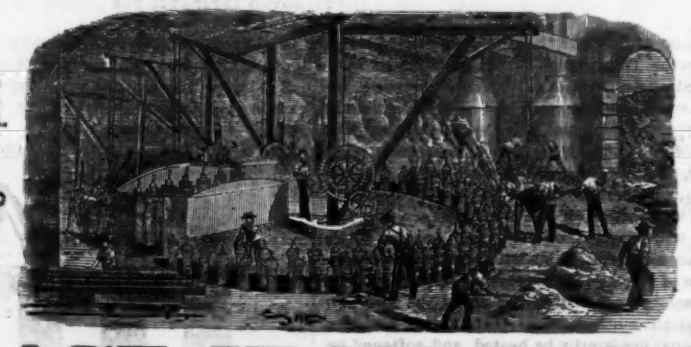

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The Main Drainage of Paris.

Almost coincidently with the formal completion of the main drainage system in London has been issued a statement from those who may, in English phrase, be termed the Commissioners of the Seine, on a precisely kindred subject in Paris. It begins by contradicting the popular, and especially the foreign, idea that the capital of France is a dry city—asserting, on the contrary, that the average daily rainfall equals half the amount artificially supplied for the consumption of all the inhabitants. Tide floods, which mingle together, contaminated by the pollutions of streets, of dirty roofs, and all else constituting an infectious flow wherever any population, great or small, is gathered together, must be got rid of systematically, somehow. The gutters, sinks, vertical pipes down the fronts of houses, the gratings and runnels in the streets, were useless without the immense number of subterranean canals carrying off all this excess, at a point far from Paris, into the river, though necessarily not so near to the sea as are our own sewage outfalls. There is a curious, though not an exact, parallelism between the history of the two systems. That of the English metropolis was ordered by act of Parliament to be carried out in the year 1858; in the same year that of the French metropolis was completed. It is needless to dwell upon the crying necessities which existed for both; but Paris was, perhaps, in the worse condition of the two. In distant times the state of her streets was an abomination patent to the eyes even of those who looked out from palace windows. In more modern days the evil became so intolerable that wealthy private individuals protected their lives by draining, at their own expense, the thoroughfares in which they resided. Later still, after a storm, the streets of the lower town had to be crossed on temporary wheeled bridges, always kept in readiness; and so late as 1839, a petition of the inhabitants represented to the government that whole quarters would be depopulated if some abatement of the evil did not take place. Even then nearly twenty years elapsed before the grand reform was effected; but it was a real one, and upon a magnificent scale. The French, who are fond of splendid phraseology, declared that a new or underground Paris has been created; but, apart from the national habit of verbal exaggeration, it was perfectly true that an immense work had been accomplished in the face of stupendous difficulties. For, at that time, and since, the city was being converted above, as well as below, by means of new streets, squares, public edifices, and railway termini; and it was, moreover, found that there were three miles of habitations for every mile of sewer. The task at that time taken in hand occupied about nine years in its fulfillment, and the results have been now about eighteen years in operation. That their success has been great, as the administration asserts, is not to be denied. It has had the happiest effects upon the health, the pleasantness, and even the external aspects of Paris; but that nothing remains to be done, more particularly in the outer circle of the city, not even the board, as we should term it, of "bridges and roads" attempts to show. Indeed, its primary object in drawing the attention of the minister to the subject is that he may be induced to support a suplemental plan for bringing within the cope of the Parisian main drainage system the outlying yet contiguous districts, which can scarcely any longer be regarded as suburbs. The undertaking, it is urged, would be neither formidable in the obstacles presented by it, nor costly in the execution, because—the argument is an official one, be it remembered, and not altogether supported by experience—the existing chief arteries, constructed, not to answer the puposes of a generation or two, but designed upon a scale of more than Roman grandeur—literally—are capable of receiving any number of affluents that could possibly be directed into them. In magnitude, of course, they do not approach those of London, but, in every other respect, they are not less remarkable. The entire arrangements is distinguished under two heads—principal arteries and feeders. Little value is assigned to pumping stations or reservoirs. The French comparison, in fact, is that of a fish's skeleton running beneath the roadway: the dorsal bone is the "collector," the lateral bones are the drains, whether from the houses or the gutters. The former, or the largest of them, follows the lines of the valleys which so characteristically mark the configuration of the French capital, so that they may receive the tribute of the more elevated quarters, and they are three in number: One, on the right bank of the river, known as the "departmental," on account of its vast extent, the wide basin it drains, and its being regarded as taking precedence of the other two; and this divides into three large branches, gorged by the sewage of the worst quarters—the cattle markets, the public slaughter houses, the gas works, the immense industrial establishments of La Villette, Montmatre, Belleville, St. Denis and even the crowded hamlet of Bondy. Eighteen months ago it was considered more than sufficient for any conceivable accumulation; but it is now affirmed that the outlet into the river not far from Saint Ouen is occasionally so choked that its arch threatens to burst. This, however, it is explained, may be accounted for by the fact that, at a particular point, one *embouchure* carries off the load brought down by two of the vast vaulted subways that intersect subterranean Paris. The second great collector, on the same side of the stream, starts from the Arsenal Basin, and continues its course through, a purer neighborhood, until it reaches the village of Asnieres, where it vomits—to employ the word in its Roman sense—its contents into the Seine, to the infinite detriment of waters that would otherwise be delightful. The government is urged to take this fact into consideration, in conjunction with the municipality, and to relieve, if possible, so favorite a pleasure resort of the Parisians from so noxious a neighbor. For, it is pointed out, beside the crowded tract of town between the arsenal and the railway, it bears a pestiferous load from the Sebastopol district, the Rue de Rivoli, with all its mansions, hotels, side thoroughfares, and royal dwellings; and elsewhere, including the Place de la Bastille, the Boulevard Malesherbes, &c.; it receives, in fact, the discharge from the great sewer of the Petits-Champs, and the dangerous drain named after Richelieu, which, at the first drop of rain, is choked, and much dreaded by the workmen on account of its steep falls from the higher to the lower level. On the other or left bank of the Seine there is only one "collector," which includes, however, that which was once a pretty running water—the Biviere—which for many years was the Fleet Ditch of Paris, famous for the abominations it poured (many colored and fœtid) into the stream which is the pride of Paris, near the bridge of Austerlitz. This also makes an exchange with its parallels beneath the opposite bank, and, after traversing many populous neighborhoods, adds its unclean flood to the Seine.

Thus, in a space of nine or ten years, Paris is reminded it acquired, at a rough estimate, 400 miles of new or renovated drainage constructed upon improved principles. Formerly its sewers were built of common ragstone, soft, pervious and perishable; then of what is called, in the vicinity of Paris, where it abounds, "millstone rock." In 1844 Roman cement was employed for the arching only, but, after 1855, the entire surface of the "gallery" was coated with hydraulic cement, insuring a solidity and a capacity for cleanliness unprecedented. Few cases of asphyxia, we are told, now occur. The strange phenomena which, in the reign of Louis XIII., were known by the equally strange designation of "basiliske," have been driven away; overgorgings, whether of water or rubbish, are, in the main channels, so rare as hardly to be taken into account. The slopes were, in the first instance, carefully settled, though here and there they are in actual course of improvement; and a visit to the sewers of Paris is, in our days, equivalent to a pleasure trip—that is to say, there are certain show sections; but they must not be taken as more than an exemplification of drainage, *de luxe*, beginning with the Place du Chatelet and ending at the Madeleine. They are not, however, to be despised on that account. The gigantic hall, whence branch the grand "canals," leads to underground roads, whence, looking up, the eye is attracted by a series of metal conduits, black and polished as ebony, which carry across this twilight highway the waters of the Ourcq and of the Seine itself; and, farther on, of the Vanne—engineering works of which the French are not unjustly proud. Along the sides of these Titan tunnels run the tubes of the pneumatic dispatch; in the thickness of the wall are offices for clerks and lamplighters; lights enclosed within porcelain globes hang from the iron columns; there are rails and trains through the long perspective of semi-darkness. But this, as already suggested, is little in connection with the practical drainage works. A little further on, and sewage barges float upon a stream which calls up an idea of the classic Acheron. They are manned by the pilots of a singular navigation, which shuts and taps as it passes the several districts, and so in a manner regulates the general outpouring. A distinction will here be seen, broad and unmistakable, between the London and the Paris systems, even if only mechanically considered. But, we may repeat, the subterranean Paris exhibited to visitors does not comprise all that might be shown—at least to observers of a more practical class. The attention of the minister is drawn by the original engineer of the works that, since they were nominally completed, twelve different types of drains have been experimented upon; the grand "collector," with its broad sideways, the hollow within a hollow, leaving room for cleansing and the search after lost valuables; the drains from private houses, generally very steep in their descent toward the central "collector;" and seven or eight other varieties in form and size. As to size, it is scarcely possible to exaggerate the precautions that are necessary when a tempest of rain occurs. In July, 1872, a storm broke over Paris, accompanied by a startling fall of rain; the great running vault beneath the Rue Rivoli was, within a quarter of an hour, full; the water burst through the street gratings; many workmen were swept away: and, even now, notwithstanding the superb proportions of "subterranean Paris," five minutes' flood will imperil the city. It is by no means asserted by the memorialists that the principle of the Paris system is defective. On the contrary, they insist upon its architectural spaciousness and massiveness, its capacities of out-throw, and its power of "collecting" the superfluous waters of a storm. But the "statement"—it might be wrong to speak of it as a report—although we have used the term "sewage," really says very little concerning sewage at all. It is nearly all confined, as were the plans of M. Belgrand's engineers, to the carrying off of superfluous water. There is nothing, or scarcely anything, said to the government about the *exuvia* of the city; yet suggestions are made vaguely in respect of this vital question, since, as the report (if so it may be termed) puts the point plainly, a system of main drainage, which is made also a plan of promenades, cannot be very practical except before being employed." But, it adds, a great advantage is gained through the power of, at any time within a few hours, shutting off and drying up a part of the extraordinary labyrinth for purposes of examination or repairs; and a special characteristic is the machinery employed—invented, indeed, since the ostentatious opening of the works—for the lifting up and disposal of such extraneous offal as masses of stable straw, hanged cats, drowned dogs, and unfeathered mattresses, the amount of which, the commissioners say, "stupefied us." Another and more tragic aspect of these vaulted highways might be alluded to, but it is unnecessary. In the parts, it is officially affirmed, which are not liable to inspection by strangers, every possible experiment is, even now, being tried, so far as regards arches of a marble unity, walls exuding and absorbing little damp, floors impermeable to any moisture except that which they carry away, and the fluted earthenware pipes, which, according to the same authority, act as final adjuncts to the rest. Another, and even a grotesque, aspect might be given to the subject by the grave reflections bestowed upon that which has generally been regarded as a ludicrous aspect of the Parisian main drainage—the rats. The sewers of Paris engender these vermin in their worst and most ferocious form, and, incredible though it may seem, they were long under a kind of official protection for the sake of their skins, which afforded a great supply to the kid glove making trade of the capital, and to various other industries of that versatile metropolis, which are not yet, perhaps, sufficiently understood. This, however, at the best is only a parenthesis. It is important to know that, according to the appeal addressed to the Minister of State, the example of London is at last quoted, and that the produce of the Parisian sewers will, before long, be spread around in endeavors to further irrigate and fertilize the long exhausted districts around.

But for the moment it suffices to appreciate the enormous and complicated works which, upon a scientific and practical representation to the French government, it is at length proposed to complete.

Malleable Iron Castings—Oscar Barnett's Foundry.

A correspondent of the Philadelphia *Journal of Commerce* gives the following description of Oscar Barnett's malleable iron works, in Newark, N. J:

The grounds occupy nearly one-half of the block bounded by Hamilton, Lafayette, McWhorter and Bruen streets, and are entirely covered by the necessary buildings, which are substantial brick structures, two and three stories high, and extend 175 feet on Hamilton street, and 115 feet each on McWhorter and Bruen streets. They consist of two foundries, an annealing house, machine shops, pattern shops and vaults, core rooms, galvanizing room, tumbling or cleaning room, assorting room, engine and boiler rooms, etc., and the office, which is located on the corner of McWhorter and Hamilton streets. Every department is fitted up with the best machinery and appliances, and the whole establishment is probably the most complete of its kind in the United States. The foundries are both extremely large, one having a capacity of 3500 molds, and the other of 8000. A portion of the molding is done with the aid of a new and valuable machine which effects a saving of at least one-third the time, and presses the sand down perfectly even all over the mold. Connected with these foundries are two cupolas, one having a capacity of two tons of iron per hour, and the other—a new one—of five tons. They are both supplied with air by one of Clark's Patent Blowers. In the tumbling room we saw sixteen barrels, in which the castings are tumbled to clean them, which are running twenty-two out of the twenty-four hours of the day. In the pattern shops both metal and wood patterns are made, four men being constantly employed in making the former, and two the latter. The pattern vaults are fireproof, having cement walls twenty-four inches thick, and a solid iron door to close the entrance. In these vaults the patterns are kept when not in use, and a man is employed whose special duty is to see that they are all carried in and securely locked up every night. We saw an immense variety of patterns of every conceivable description, the value of which it is impossible to estimate, but we were informed that the first cost was nearly or quite $400,000. Our readers can thus perceive the almost incalculable value of the fire-proof vaults.

The engine which drives the machinery in this establishment is of 35 horse-power, supplied by two boilers, built by Lyons, of 40 horse-power each. The amount of iron consumed here weekly is about 25 tons. The malleable iron works, spoken of above, also owned by Mr. Barnett, are located on N. J. R. R. avenue. The grounds extend along the avenue between Johnson and Pennington streets 100 feet, and back from the avenue on each of said streets for a distance of 250 feet. The buildings are 100x175 feet in size, two stories high, and are principally the same as those of the establishment described above. The foundry is extremely large (with a capacity of fifty molders at one time). In this Mr. Barnett has an air furnace, the only one in New Jersey, by the way, in which the iron is melted by hot blast.

Soft coal and tar are used to heat the blast, and the iron thus produced is much purer than by the old method, and is used in making heavy castings. The cupolas at this establishment are the same in number and of the same capacity as those at the gray iron foundries, also supplied with air by one of Clark's Blowers.

The pattern house is fire-proof, and contains patterns, the original cost of which was about $200,000. In the foundry we saw some iron castings before being put through the annealing process, which would break almost as easily as glass, but after coming from the annealing furnace, in which they are kept at a white heat for from eight to ten days, they are as hard to break as the elastic conscience of a fire-eating politician or a back pay Congressman.

The tumbling room contains ten barrels. The engine used to drive the machinery in this establishment is of 50 horse-power. A private telegraph wire connects this office with the office of the gray iron foundries at Hamilton and McWhorter streets. An elevator in the foundry building is used to transport material and finished goods from floor to floor. These works consume about 15 tons of iron per week, which, together with the 25 used at the other foundries, makes a total of 40 tons per week, or nearly 5,000,000 pounds per annum. This establishment is in charge of Mr. Barnett's brother, Horace B. Barnett. In addition to the above described extensive establishments, Mr. Barnett has a store at Nos. 34 and 36 McWhorter street, for storing large quantities of finished goods. This is in charge of another brother, Richard M. Barnett. Near this building are located the stables and wagon houses. The work in the gray iron foundries is confined to the manufacture of gray iron castings.

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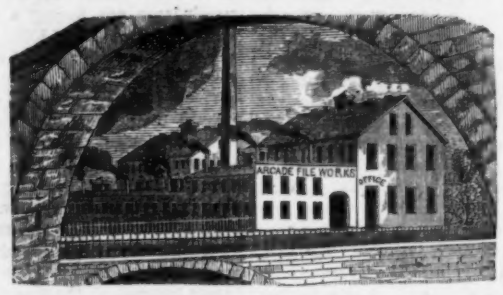

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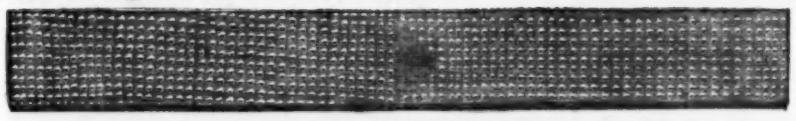

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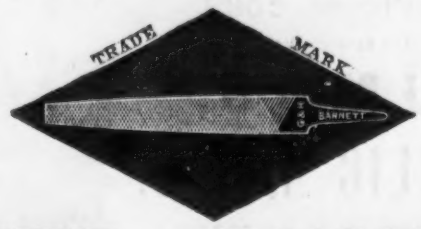

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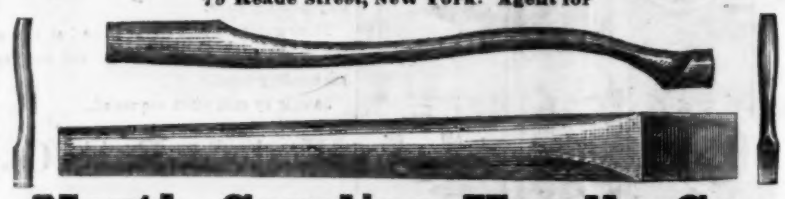

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Self-Closing Faucets.

There are in New York at present about a half a dozen patented self-closing faucets owned by as many manufacturers. We here describe the different patents, and present the advantages claimed for them by the makers.

HOTZ'S FAUCET

is manufactured by the E. P. Gleason Mfg. Co., corner Mercer and Houston streets. It is a pressure faucet, and has already been described in these columns.

The manufacturers claim for this faucet that it is subject to very little friction or wear, since it does not operate on the principle of a screw. As explained above, it can be regulated to any pressure. It does not hammer the pipe, it is claimed, because, if there is any unusual force exerted on the valve from the reaction of the water after closing the faucet, the valve will rise and allow of the escape of the water. As a consequence, no air chamber is needed. For a similar reason, the freezing of water will not burst the pipes, since the expansion of the water from freezing will open the faucet, relieving the pressure. Boiler explosions are also prevented in a similar manner, the valve always rising to relieve an excess of pressure. As a consequence, the manufacturers claim that pipe of less weight may be used than in the case of ordinary faucets. This would result in a saving sufficient, it is claimed, to pay for the faucet.

THE WENTWORTH FAUCET

is also self-closing, and is manufactured by Hayden, Gere & Co., of 84 Beekman street. This faucet is now about two years old, and has been introduced throughout the Windsor and Sturtevant houses, of this city, and the United States Hotel at Saratoga. It is operated by a horizontal arm or spindle. The valve is made with a rectangular space in it, into which extends a horizontal rod. The latter is a continuation of the operating spindle, at the outer end of which is a handle. One of the sides of the space cut in the valve is formed as a rack, and is engaged by a pinion fixed upon the inner extremity of the horizontal rod before referred to. The latter is held in bearings extending from the case of the faucet on both sides of the valve, and by its partial rotation, compels the rise of the valve from its seat. The valve stem is received within, and guided by, the top of the cock, and the body of the valve is surrounded and sustained by a collar. Surrounding the valve stem, and having its ends bearing respectively on the shoulder of the valve and against the top, is a coil spring, which supplies the resistance against which the valve is manually raised and which returns it to its seat.

By such an arrangement of parts the practical construction of the basin cock is much simplified, as the valve in one direction and the rod in its bearings in the other can be ground to fix exactly, and by the arrangement of the operating handle on the side of the cock, the necessity for packing any joint above or near the coil spring is avoided. The top of the standard is formed into a soap cup or ring holder, as may be desired.

TRAFTON'S PATENT FAUCET

is sold by Messrs. Waefelaer, Duyster & Co. It is a self-closing faucet, and the valve is lifted from its seat by a crank attached to the operating shaft. The valve seat is in the body or upright portion of the cock, and upon this seat the valve rests, but when the valve is opened there is the necessary passage way within the body, around the valve. The bib, or delivery pipe, may be of any desired character, and passes out from the body either at the top or the side. The shaft and spring that act upon the crank and valve are contained in the horizontal cylinder or socket which extends from the body. The shaft terminates internally with a cylindrical plug, crank and crank pin, the latter of which passes through the valve stem. The plug at the end of the operating shaft has a shoulder that bears against the inner end of the socket. Within the socket is a spring, one end of which is attached to the plug, and the other end to a polygonal bush that enters into a correspondingly shaped recess at the outer end of the socket, and is confined therein by the cap.

The parts are placed together with the spring coiled sufficiently to press the valve firmly in its seat, and the spring can be wound up to whatever extent is desirable by revolving the polygonal bush previous to forcing it back into its recess. After this the cap is put on, and then the handle is secured to the operating shaft or spindle. By partially rotating the shaft against the action of the spring the crank will lift the valve opening the water way; when the handle is liberated the spring immediately closes the cock by revolving the crank and forcing the valve to its seat.

ANOTHER TRAFTON FAUCET

is being introduced by the same firm. It can be placed in a corner or in a place in which it would be inconvenient to place the faucet just described, on account of the room required for the horizontal socket and handle. In the new faucet the handle is placed above the body, and the valve is raised by a toggle joint. The valve stem is widened and a portion of it cut away, as in other self-closing valves, forming a rectangular recess to admit of the insertion of the self-closing devices.

THE BOSTON SELF-CLOSING FAUCET

is sold in this city by Adee & Delerec, 275 Pearl street. In this case the handle is placed above the body of the faucet and is turned horizontally. A spindle is attached to the valve and passes up through the handle, and upon its upper extremity is screwed a nut which bears down upon the handle. Consequently, whenever the handle is raised the valve is raised also. A stout spring is coiled around the spindle connected at its lower extremity with the valve, and at its upper extremity with the stock of the faucet. The handle of the faucet is fixed to a cylinder, which passes down over the spindle until it meets the stock. It also surrounds a cylinder, cast upon the stock, and surrounding the spindle. The upper portions of the latter cylinder are cut away, so as to give its upper base the shape of two spirally inclined planes. Upon the inner surface of the cylinder to which the handle is fixed is cast a cylinder whose lower surface is also cut, so that the lower base consists of two spirally inclined planes. When the cylinder to which the handle is attached is placed over the spindle the two sets of inclined planes fit exactly into each other. If, however, the handle is turned, the inclines sliding upon each other, the handle must rise, and as the spindle is secured to it by the nut as above described the valve must rise also. When the manual force is removed the strength of the spring brings the valve back to its seat. If, however, the inclines are not very steep the force of the spring is not sufficient to return the valve to its seat. In such a case the handle must be turned back again to close the faucet. Therefore, by making the incline very slight, the faucet loses its self-closing character and becomes a compression faucet.

THE SOFFE FAUCET

has been recently introduced by Henry Soffe, of 48 Greene street. In its operation it resembles, in some respects, other self-closing faucets. It is made with a valve which is pressed to its seat by a spring and is raised by inclines. In this invention, however, the inclines are out of sight, so as not to injure hands or clothing that may come in contact with the faucet. The spindle is also only subjected to the strain due to its revolution, the opening and closing forces being concentrated on the valve itself, as may be understood from the following description:

The valve stem passes through the screw cap at the top down to the valve seat at the bottom. At its lower extremity is the valve. A spring coiled around the stem, pressing against the screw cap above and the valve below, closes the latter. Upon the interior surface of the barrel surrounding the valve seat are cast inclines, and upon the valves are cast projections, or fingers, which extend above the inclined surfaces and rest upon them. Their ends touch, or nearly touch, the inner walls of the cylinder. The spring coiled around the valve stem and pressing on the valve holds the latter to its seat against the pressure of water. When, however, the valve and stem are turned by the handle, the fingers which project from the valve run up the inclines, lifting the valve against the pressure of the spring, and when the handle is released the valve closes by the action of the spring again. If the length of the cylinder which contains the valve is such that the fingers which move upon the inclines can be turned around until they reach a flat place that is formed at the top of the inclines, then the valve can be left open after the parts have been turned around to this point. In this faucet the inclines and fingers are lubricated by the liquid passing through the cock.

At Polton Colliery, near Edinburgh, there is at work a new coal cutting machine which is said to give very good satisfaction. The machine consists of a frame, which is carried up between two end frames by means of studs or journals keyed to blocks which move up or down in slides formed in the center of each of the end frames; thus, the whole machine, while held firmly between the end frames, can be raised, depressed, or canted to any angle that may be required. The means employed for this purpose are two powerful screws, passed through the blocks fitted in the slides, and acting as a nut. Other two screws are employed in almost the same manner to cant or angle the machine to suit the dip or rise of the seam the machine is engaged in cutting. The end frames are mounted on wheels, which run on rails. On the frame are placed two cylinders 6 in. in diameter and 10 in. stroke, which drive a spur wheel, which again gives motion to a revolving wheel or disc, and on both sides of this disc, at regular intervals, are placed loose or revolving cutters of about 5 in. in diameter, pointed as pick points. Thus, when the disc revolves the cutting wheels, being loose on keys fastened to the disc, are revolving at ten times the speed of the disc. The machine propels itself by a chain, which is fast at one end, and works upon a small barrel. The peculiarity of the machine is its cutting wheels, which, being loose and revolving, thereby lessen the friction, and the screws, with which the machine can be set to any angle. It is driven by compressed air, and the the average pressure necessary is 30 lbs., which is supplied by an air compressor on the surface. There is a peculiarity in this compressor—it is not jacketed, nor is there any water surrounding the air cylinder; instead of this there is a simple self-acting water jet, which, at the same time, cools the air and cylinder and lubricates the piston. The air compressor is driven by the pumping gear of the winding engine, and the whole cost of the machine, compressor and pipes will not exceed £300. This machine, it is stated, can also be driven by an endless rope or chain, instead of compressed air.

Gerry, Tilton & Colwell, railroad iron dealers, of this city, state that they were embarrassed on account of their connection with the Gerard Tube Works, of Pittsburgh, and the Pittsburgh Bolt Company. On the suspension of those concerns they decided to stop, and a proposition to their creditors was made to pay 25 cents on the dollar on one endorser, 35 cents on two names, and 45 cents on three names. Eighty per cent. of their creditors accepted, but two commenced suit; and in order that all their creditors might have share and share alike, the firm made an assignment. The amount of the liabilities of the three firms is about $1,500,000. If the suits mentioned are decided against the firm, they will be obliged, it is said, to go into bankruptcy. The firm have recently assigned to E. R. Wiggin and Eben F. Bacon, and have liabilities amounting to $511,510·19, and assets of $398,062·56.

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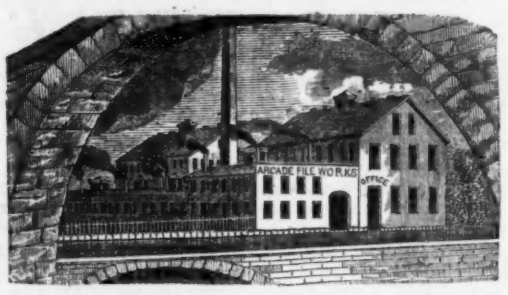

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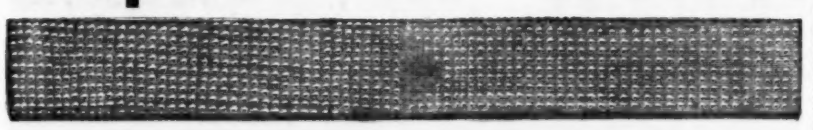

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We invite the attention of the trade to our **Celebrated American Horse Rasps and Files.** These Rasps are made from the very best American Steel, all cut by hand, and we warrant them equal to any other make in the market. For the information of persons unacquainted with our goods, we will state that every File or Rasp manufactured by us, since our establishment in 1866, have been stamped "*Heller & Bros.*" though commonly called the "*Heller Rasp.*" All Rasps not stamped as annexed diagram are not genuine. We will send sample lot, if requested, and if not as represented they can be returned, or held subject to our order, free of all charges. For sale by the leading Hardware Dealers in the United States.

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HORSE SHOE NAILS.

Manufactured from the best of **NORWAY** Iron, nd warranted to give entire satisfaction.

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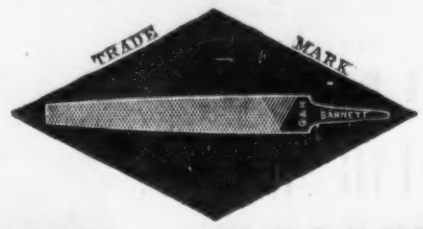

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Flower Pot Brackets, Flower Pot Stands, Aquaria, Ferneries, Bird Cage Hooks, Propagating Cases, Window Gardens, &c., &c.

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Tredegar Horse and Mule Shoes.

These superior Shoes are made of the Best Virginia Charcoal Iron. They are well adapted to Western and Southern demand, and are shipped to all prominent markets at freights as low as on other makes.

THE TREDEGAR COMPANY, Manufacturers,

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79 Reade Street, New York. Agent for

North Carolina Handle Co.,

(WILSON & SHOBER, Proprietors.)

Manufacturers of *SPOKES, AXE, PICK, SLEDGE, HAMMER, HATCHET, and other Handles.* Full assortment always on hand.

Self-Closing Faucets.

There are in New York at present about a half a dozen patented self-closing faucets owned by as many manufacturers. We here describe the different patents, and present the advantages claimed for them by the makers.

HOTZ'S FAUCET

is manufactured by the E. P. Gleason Mfg. Co., corner Mercer and Houston streets. It is a pressure faucet, and has already been described in these columns.

The manufacturers claim for this faucet that it is subject to very little friction or wear, since it does not operate on the principle of a screw. As explained above, it can be regulated to any pressure. It does not hammer the pipe, it is claimed, because, if there is any unusual force exerted on the valve from the reaction of the water after closing the faucet, the valve will rise and allow of the escape of the water. As a consequence, no air chamber is needed. For a similar reason, the freezing of water will not burst the pipes, since the expansion of the water from freezing will open the faucet, relieving the pressure. Boiler explosions are also prevented in a similar manner, the valve always rising to relieve an excess of pressure. As a consequence, the manufacturers claim that pipe of less weight may be used than in the case of ordinary faucets. This would result in a saving sufficient, it is claimed, to pay for the faucet.

THE WENTWORTH FAUCET

is also self-closing, and is manufactured by Hayden, Gere & Co., of 84 Beekman street. This faucet is now about two years old, and has been introduced throughout the Windsor and Sturtevant houses, of this city, and the United States Hotel at Saratoga. It is operated by a horizontal arm or spindle. The valve is made with a rectangular space in it, into which extends a horizontal rod. The latter is a continuation of the operating spindle, at the outer end of which is a handle. One of the sides of the space cut in the valve is formed as a rack, and is engaged by a pinion fixed upon the inner extremity of the horizontal rod before referred to. The latter is held in bearings extending from the case of the faucet on both sides of the valve, and by its partial rotation, compels the rise of the valve from its seat. The valve stem is received within, and guided by, the top of the cock, and the body of the valve is surrounded and sustained by a collar. Surrounding the valve stem, and having its ends bearing respectively on the shoulder of the valve and against the top, is a coil spring, which supplies the resistance against which the valve is manually raised and which returns it to its seat.

By such an arrangement of parts the practical construction of the basin cock is much simplified, as the valve in one direction and the rod in its bearings in the other can be ground to fix exactly, and by the arrangement of the operating handle on the side of the cock, the necessity for packing any joint above or near the coil spring is avoided. The top of the standard is formed into a soap cup or ring holder, as may be desired.

TRAFTON'S PATENT FAUCET

is sold by Messrs. Waefelaer, Duyster & Co. It is a self-closing faucet, and the valve is lifted from its seat by a crank attached to the operating shaft. The valve seat is in the body or upright portion of the cock, and upon this seat the valve rests, but when the valve is opened there is the necessary passage way within the body, around the valve. The bib, or delivery pipe, may be of any desired character, and passes out from the body either at the top or the side. The shaft and spring that act upon the crank and valve are contained in the horizontal cylinder or socket which extends from the body. The shaft terminates internally with a cylindrical plug, crank and crank pin, the latter of which passes through the valve stem. The plug at the end of the operating shaft has a shoulder that bears against the inner end of the socket. Within the socket is a spring, one end of which is attached to the plug, and the other end to a polygonal bush that enters into a correspondingly shaped recess at the outer end of the socket, and is confined therein by the cap.

The parts are placed together with the spring coiled sufficiently to press the valve firmly in its seat, and the spring can be wound up to whatever extent is desirable by revolving the polygonal bush previous to forcing it back into its recess. After this the cap is put on, and then the handle is secured to the operating shaft or spindle. By partially rotating the shaft against the action of the spring the crank will lift the valve opening the water way; when the handle is liberated the spring immediately closes the cock by revolving the crank and forcing the valve to its seat.

ANOTHER TRAFTON FAUCET

is being introduced by the same firm. It can be placed in a corner or in a place in which it would be inconvenient to place the faucet just described, on account of the room required for the horizontal socket and handle. In the new faucet the handle is placed above the body, and the valve is raised by a toggle joint. The valve stem is widened and a portion of it cut away, as in other self-closing valves, forming a rectangular recess to admit of the insertion of the self-closing devices.

THE BOSTON SELF-CLOSING FAUCET

is sold in this city by Adee & Deleree, 273 Pearl street. In this case the handle is placed above the body of the faucet and is turned horizontally. A spindle is attached to the valve and passes up through the handle, and upon its upper extremity is screwed a nut which bears down upon the handle. Consequently, whenever the handle is raised the valve is raised also. A stout spring is coiled around the spindle connected at its lower extremity with the valve, and at its upper extremity with the stock of the faucet. The handle of the faucet is fixed to a cylinder, which passes down over the spindle until it meets the stock. It also surrounds a cylinder, cast upon the stock, and surrounding the spindle. The upper portions of the latter cylinder are cut away, so as to give its upper base the shape of two spirally inclined planes. Upon the inner surface of the cylinder to which the handle is fixed is cast a cylinder whose lower surface is also cut, so that the lower base consists of two spirally inclined planes. When the cylinder to which the handle is attached is placed over the spindle the two sets of inclined planes fit exactly into each other. If, however, the handle is turned, the inclines sliding upon each other, the handle must rise, and as the spindle is secured to it by the nut as above described the valve must rise also. When the manual force is removed the strength of the spring brings the valve back to its seat. If, however, the inclines are not very steep the force of the spring is not sufficient to return the valve to its seat. In such a case the handle must be turned back again to close the faucet. Therefore, by making the incline very slight, the faucet loses its self-closing character and becomes a compression faucet.

THE SOFFE FAUCET

has been recently introduced by Henry Soffe, of 48 Greene street. In its operation it resembles, in some respects, other self-closing faucets. It is made with a valve which is pressed to its seat by a spring and is raised by inclines. In this invention, however, the inclines are out of sight, so as not to injure hands or clothing that may come in contact with the faucet. The spindle is also only subjected to the strain due to its revolution, the opening and closing forces being concentrated on the valve itself, as may be understood from the following description:

The valve stem passes through the screw cap at the top down to the valve seat at the bottom. At its lower extremity is the valve. A spring coiled around the stem, pressing against the screw cap above and the valve below, closes the latter. Upon the interior surface of the barrel surrounding the valve seat are cast inclines, and upon the valves are cast projections, or fingers, which extend above the inclined surfaces and rest upon them. Their ends touch, or nearly touch, the inner walls of the cylinder. The spring coiled around the valve stem and pressing on the valve holds the latter to its seat against the pressure of water. When, however, the valve and stem are turned by the handle, the fingers which project from the valve run up the inclines, lifting the valve against the pressure of the spring, and when the handle is released the valve closes by the action of the spring again. If the length of the cylinder which contains the valve is such that the fingers which move upon the inclines can be turned around until they reach a flat place that is formed at the top of the inclines, then the valve can be left open after the parts have been turned around to this point. In this faucet the inclines and fingers are lubricated by the liquid passing through the cock.

At Polton Colliery, near Edinburgh, there is at work a new coal cutting machine which is said to give very good satisfaction. The machine consists of a frame, which is carried up between two end frames by means of studs or journals keyed to blocks which move up or down in slides formed in the center of each of the end frames; thus, the whole machine, while held firmly between the end frames, can be raised, depressed, or canted to any angle that may be required. The means employed for this purpose are two powerful screws, passed through the blocks fitted in the slides, and acting as a nut. Other two screws are employed in almost the same manner to cant or angle the machine to suit the dip or rise of the seam the machine is engaged in cutting. The end frames are mounted on wheels, which run on rails. On the frame are placed two cylinders 6 in. in diameter and 10 in. stroke, which drive a spur wheel, which again gives motion to a revolving wheel or disc, and on both sides of this disc, at regular intervals, are placed loose or revolving cutters of about 5 in. in diameter, pointed as pick points. Thus, when the disc revolves the cutting wheels, being loose on keys fastened to the disc, are revolving at ten times the speed of the disc. The machine propels itself by a chain, which is fast at one end, and works upon a small barrel. The peculiarity of the machine is its cutting wheels, which, being loose and revolving, thereby lessen the friction, and the screws, with which the machine can be set to any angle. It is driven by compressed air, and the the average pressure necessary is 30 lbs., which is supplied by an air compressor on the surface. There is a peculiarity in this compressor—it is not jacketed, nor is there any water surrounding the air cylinder; instead of this there is a simple self-acting water jet, which, at the same time, cools the air and cylinder and lubricates the piston. The air compressor is driven by the pumping gear of the winding engine, and the whole cost of the machine, compressor and pipes will not exceed £300. This machine, it is stated, can also be driven by an endless rope or chain, instead of compressed air.

Gerry, Tilton & Colwell, railroad iron dealers, of this city, state that they were embarrassed on account of their connection with the Gerard Tube Works, of Pittsburgh, and the Pittsburgh Bolt Company. On the suspension of those concerns they decided to stop, and a proposition to their creditors was made to pay 25 cents on the dollar on one endorser, 35 cents on two names, and 45 cents on three names. Eighty per cent. of their creditors accepted, but two commenced suit; and in order that all their creditors might have share and share alike, the firm made an assignment. The amount of the liabilities of the three firms is about $1,500,000. If the suits mentioned are decided against the firm, they will be obliged, it is said, to go into bankruptcy. The firm have recently assigned to E. R. Wiggin and Eben F. Bacon, and have liabilities amounting to $511,510·19, and assets of $398,062·56.

GEORGE GUEUTAL & SON,

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Wood Screws, Steel in Sheets,

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Bed Screws, Pin Hinges, and Wire Nails a Specialty.

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MANUFACTURER OF

Saws of all kinds.

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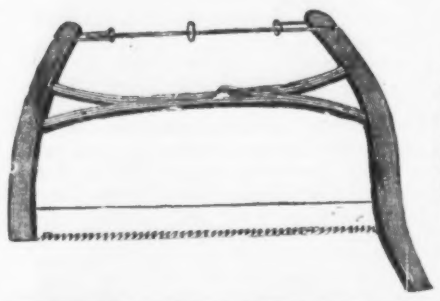

Elliptic Forked Saw Frame.

Patented June 28th, 1870.

The annexed engraving represents my ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any center bolt, secures for the Frame great strength and durability. These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

HARVEY W. PEACE,

Sole Proprietor & Manufacturer,

VULCAN SAW WORKS,

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AMERICAN SAW CO.,

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PERFORATED CROSS-CUT SAWS

And SOLID SAWS of all kinds. Trenton, N. J.

THE SILVER STEEL

DIAMOND CROSS-CUT SAW.

$1.50 Per Foot.

Patent Secured

PATENT HANDLES AND GAUGE INCLUDED.

THIS new Saw, which is destined to take the place of all Cross-cut Saws in point of SPEED AND EASE, is manufactured by E. C. ATKINS & CO., Indianapolis, Ind., who are the

SOLE MANUFACTURERS FOR THE UNITED STATES.

So confident are we that this is the best Cross-cut Saw in the market that we CHALLENGE THE WORLD. Orders promptly filled.

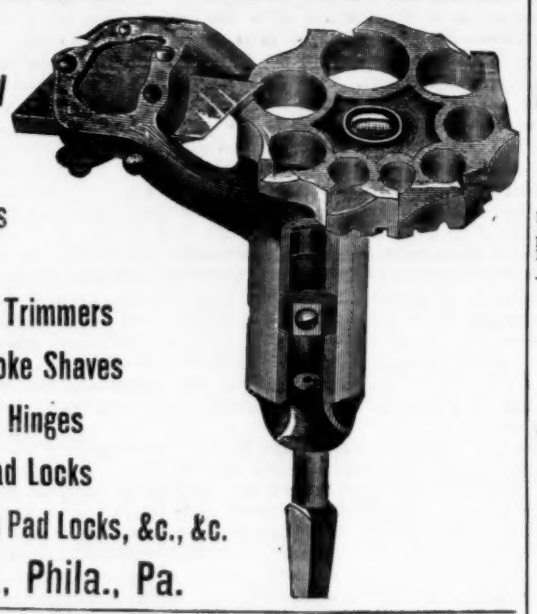
E. C. ATKINS. H. KNIPPENBERG. E. C. ATKINS & CO. Saw Manufacturers and Repairers, Indianapolis, Ind.

Lloyd, Supplee & Walton,

HARDWARE FACTORS.

MANUFACTURERS OF

Bonney's Hollow AUGERS.



Stearn's Hollow Augers and Saw Vises

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Of Superior Quality of all sizes, both

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From ¼ inch to and including 1⅛ inch Bolt.

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SAWS

Of every description, including

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80 Beekman Street,

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Manufacturer of

Saws of all kinds.

Also Sole Manufacturer of

LIGHTNING SAWS.

Two Direct Cutting Edges, instead of one Scraping point.

Note extra steel and durability over the old V, outlined on M tooth.

Telegram Dated Oct. 1st, 1874.

STATE FAIR, EASTON, PA.

To HENRY DISSTON & SONS:

Philadelphia, Pa.

I want you to publicly test that challenge on Cross Cut Saws. Name time and place within thirty days. American Institute preferred. E. M. BOYNTON.

Henry Disston & Sons, dare not respond.

E. M. Boynton gave on Wednesday of last week an exhibition of what his Lightning Saw could do at the Pennsylvania State Fair, in which two men sawed through a sound oak log, 16 inches in diameter, in 17 seconds. Mr. Boynton informs us that his export trade is increasing, he having lately made large shipments of his saws to Australia and other distant markets.—*The Iron Age*, Oct. 8, 1874.

For fuller report of this exhibition see the *Easton Morning Dispatch* of Oct. 1st, 1874.

Henry Disston & Sons cannot furnish Lightning Saws. Why do they imitate mine?

J. FLINT,

Manufacturer of

ALL KINDS OF

SAWS

And Plastering Trowels,

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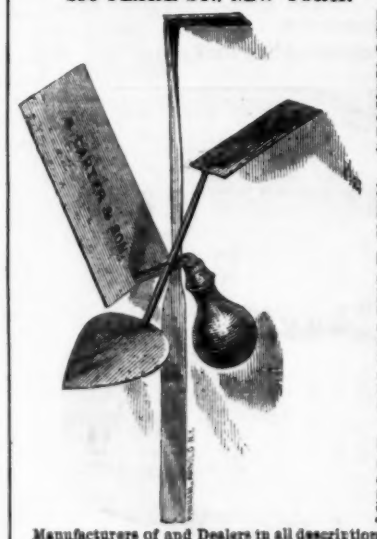
A large Stock of Cross Cut Saws constantly on hand. Orders filled promptly. Dietrich's Double Handle One Man Cross Cut Saw made with any kind of tooth desired. Our patent method of grinding Hand Saws makes them superior to any in the market. Send for Illustrated Price List.

H. CARTER,

290 PEARL ST., NEW YORK.



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Manufacturers of and Dealers in all descriptions of Moulders and Plasterers' Tools, and Dealers in General Hardware, Gilded Copper Weather Vanes.

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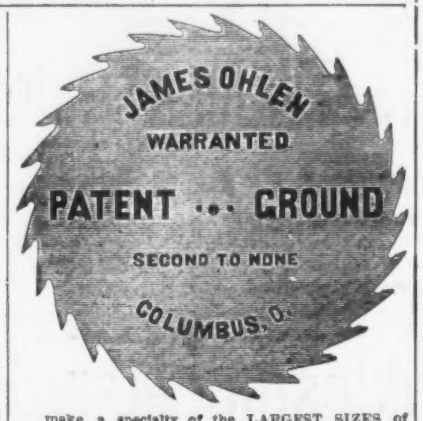
Established 1837. Manufacturers of Patent Scandinavian or Jail Locks. Brass Pad Locks for Railroads and Switches. Also, Patent Stationary R. R. Car Door Locks. Patent Piano and Sewing Machine Locks. 141 to 145 Railroad Avenue, NEWARK, N. J. Illustrated Catalogue sent on application.



make a specialty of the LARGEST SIZES of Circular Saws, and call particular attention of lumber manufacturers to the following points of excellence:

Evenness of Temper.—The peculiar structure of my furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity.

Perfect Accuracy in Thickness.—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work.

Properly Hammered.—Great care is taken that no saw shall leave my works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, cannot be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time RUN TRUE. This department is under the personal supervision of myself, who has devoted over *twenty years* to the art of saw making.

I am sole proprietor and manufacturer of the celebrated "Challenge" Cross-Cut Saw. Price Lists of all kinds of saws sent on application.

JAMES OHLEN.

VAN WART, SON & CO.

Hardware Commission Merchants.

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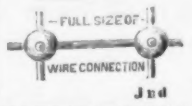

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REDUCED PRICES.

Set Iron Dogs,	⅜ to 2 in	$ 5·60
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Iron and Steel Clamps, Die Dogs, Clamp Dogs,

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Manufacturers of

FELTER'S

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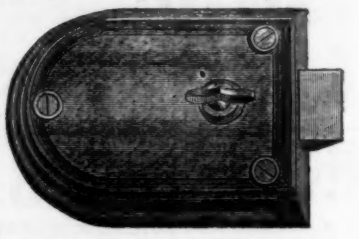


Comprising

Store Door Locks, Night Latches, Drawer, Desk and Pad Locks,

All of which are furnished with

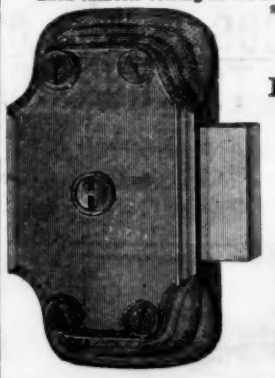
SMALL, FLAT, AMERICAN STERLING METAL KEYS,

Which are stronger than steel, *and cannot be affected by rust*, and will remain bright and clear under all ordinary circumstances.

A candid examination will convince the most unbelieving, that for simplicity, durability, convenience, and safety, they challenge comparison with any now before the public. Being made entirely by new and expensive machinery, especially constructed to manufacture them, *they will rival the best made Locks in Finish and perfect operation.*

These Locks give perfect satisfaction, because they are the safest, cheapest and most durable Lock ever presented to the public, having *thirty-five* finely finished Brass Tumblers in each Door, and twenty-eight in each Drawer Lock, each one being finely false notched.

Each tumbler bearing on the key at two different points while locking or unlocking, without the aid of springs, which cannot be said of any other patent Tumbler Locks in use.



THE LOCKS ARE FITTED TO THE KEYS

And not the Keys to the Locks.

Hence Counterfeit Keys cannot be made.

For descriptive list and terms, address

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FULL SIZE OF KEY.

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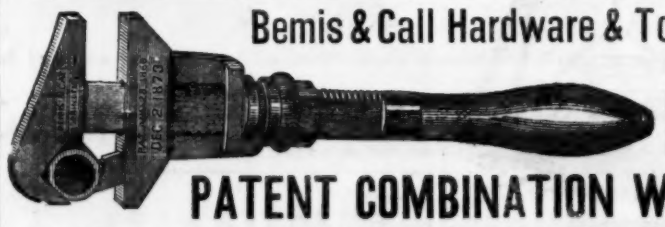

This Wrench can be furnished with Briggs' Pat. Nut or Sleeve.

PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, Case-Hardened throughout, and not only combine all of the superior qualities of our cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench, thus making a Combination which has no equal.

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Manufacturers of SPOKES and CARRIAGE WOOD WORK, AXE, PICK, German and American SLEDGE and other Handles.

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PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, Dec. 6, 1875.

Winter has come with a rush at last, locking the canals and in them an unusually large lot of grain and merchandise in transit, but not sooner than there was reason to expect it, and not in such a busy period as to cause much loss. The most unpleasant news of the week comes from the coal regions, announcing the closing, by the Reading Coal and Iron Company, of thirty out of forty collieries, which will be followed by a general stoppage of private collieries until only some twenty-five will remain in operation in the whole Schuylkill region. This will throw an immense force of miners out of employment, and must make suffering to them and those dependent upon them. Notwithstanding the strike last spring, and the suspension now, the anthracite trade of 1875 is said to have been encouraging. The total production for the year will be over 23,000,000 tons, or an increase of some 250,000 tons, all of which, with the exception of the amounts in storage yards, found a market, notwithstanding the depression in the iron trade. This shows that the market for anthracite is extending, and that, with a return of prosperity and a resumption of iron making in the Schuylkill Basin, that the present output capacity will not be beyond the legitimate demands of our industries. It is reported that the Coal and Iron Company has also shut down on its ore mines, on account of a full supply of ore to its furnaces.

A feature of the week has been the sale of the old Navy Yard, at auction, on the 24 inst. The price brought was $1,000,000, of which $50,000 was paid in cash at time of sale. The purchaser is said to be the Pennsylvania Railroad Company, and the government officials report themselves satisfied with the sale. The Pennsylvania Railroad will undoubtedly improve it for terminal facilities, and have secured a most valuable property at a low price. The old yard has many interesting incidents connected with its history. The original site cost $37,000 in 1801, and subsequently an addition was made at $15,000. Previous to this date vessels were constructed by the government at a neighboring yard, and in 1794 is recorded the receipt of a lot of oak timber, to be used in the construction of the frigate Constitution. The first ship launched was the North Carolina, in 1820, and since then most of the historic vessels of the navy were built here. Among these were the brig Dolphin, the frigate Pennsylvania, then a wonder in size; the Raritan, Vandalia, Relief and Dale followed. After this the steam frigate Mississippi, in 1840, and the Princeton, in 1843, the first naval screw in our country. Then the Germantown, the Susquehanna, the Pawnee and the Lancaster. During the war several vessels were built, but the introduction of ironclads required different construction, and the old yard has been wiped out to give place to the new naval station at League Island, which in time will be the most important and complete of its kind in the world.

The fire which destroyed the Market Street Bridge was considered a godsend in prospective "divvies" to the ring, to bridge builders, and to all concerned. Fortunately for the tax payer, and unfortunately for the speculator, Col. Scott came to the front with an offer to build a Howe Truss Bridge, wider than the old bridge, and giving better facilities for travel, within thirty days, at a cost less than the insurance on the old bridge, and to give to the city any difference, should such exist, between his estimate and contract price. He moreover offered to relay the tracks on the Chestnut Street Bridge, and to guarantee his new work for five years. The ring in councils stood aghast—dare not oppose this, the first honest scheme of years for city work, and accepted the offer on Thursday. Thursday night the timbers were ordered forward. On Friday morning *ten trains* of them were on the spot. Saturday night one span was framed and ready to put in place, and a large force is at work night and day, and will be until completion of the work. This is a most important movement for the city. It not only breaks the ring power, but it establishes a standard of cost and efficiency in city work which cannot be gainsayed, and is promising as a return to honest expenditures of municipal funds. If the Centennial had been fortunate enough to have the benefit of Col. Scott's services, it would now have every dollar needed and the work all done. The secret of this man's success, outside of his power as the head of a great corporation, is promptness of decision and honesty of purpose in all great undertakings.

The iron makers of England are "struck all of a heap" by the successful use of natural gas fuel at Pittsburgh, judging from the English papers. But if Jonathan is smart, John follows his lead quickly, and the first use they make of their knowledge is to suggest the application of gas fuel to the Danks' rotary puddler. And they will do it. We shall hear of a Siemens, or Price, or sombody's gas rotary before long, and then mechanical puddling will be a fixed fact. It remains for an American to turn Butler county into the blast furnace. The Isabella furnaces are convenient to the mills using gas; the experiment, under certain conditions, would be a success, and then the crowning glory of iron making would be reached, viz., the reduction of the ore by an almost costless fuel. If Pittsburgh wants the broom to *keep*, she must certainly use gas *in* the blast furnace, and not after it comes out of it only.

Gov. Kemper, of Virginia, has, in his message, made an eloquent appeal to the Legislature of his State in favor of an appropriation to the Centennial, and bases it upon the brilliancy of the record of Virginia in the national government and history, as well as the great effect to be looked for in the reconciliation of the two sections. The Governor's rhetoric is excellent, but the resources of this grand old State will be far more eloquent if allowed to speak for themselves. Virginia has a large unpaid debt, principal and interest, which frightens foreign capitalists away, but which, to the credit of the majority of her people, be it said, there is a firm determination to pay. No more feasible method of liquidating this debt is now open to Virginia than the exhibition of evidence of her mineral wealth at the Centennial, and as a purely business advertisement, the legislators would make money if they appropriated their salaries to the purpose. I speak advisedly when I say there is money enough to pay the whole debt of the State, to construct the James River Canal to the Ohio, and to leave a large surplus, in the two counties of Amherst and Nelson, *in iron ore alone at twenty-five cents a ton.* Once the mineral value of this State is made known capital will not be kept away from it, nor can prosperity be avoided. The Centennial will show the truth of this if the Legislature does its duty. The Centennial, however, is meeting with better appreciation all round, and every day adds to the proportions of the buildings and of the bank account of the treasurer. The telegraph announces the resignation of Col. P. Cunliffe Owen, the chief of the British Commission. This is greatly to be regretted, as he was a live, aggressive man, thoroughly experienced in this line, and as thoroughly imbued with the spirit of our Centennial. He is succeeded by Col. Herbert Sandford and Professor Archer, of the Edinburgh Museum. Col. Owen was one of the strongest advocates of our Industrial Museum, and his experience in the South Kensington Museum, of London, made his advice and assistance more valuable in this line.

A Century's Progress.

We quote as follows from the President's message:

It affords me great pleasure to recur to the advancement that has been made from the time of the colonies 100 years ago. We were then a people numbering only 3,000,000. Now we number more than 40,00,000. Their industries were confined almost exclusively to the tillage of the soil. Now manufactories absorb much of the labor of the country. Our liberties remain unimpaired. The bondsmen have been freed from slavery. We have become possessed of the respect, if not the friendship, of all civilized nations. Our progress has been great in all the arts, in science, agriculture, commerce, navigation, mining, mechanics, law, medicine, &c. And in general education the progress is likewise encouraging. Our thirteen States have become thirty-eight, including Colorado (which has taken the initiatory steps to become a State), and eight Territories, including the Indian Territory and Alaska, and excluding Colorado, making a territory extending from the Atlantic to the Pacific. On the south we have extended to the Gulf of Mexico, and in the west from the Mississippi to the Pacific. One hundred years ago the cotton gin, the steamship, the railroad, the telegraph, the reaping, sowing, and modern printing machines, and numerous other inventions of scarcely less value to our business and happiness, were entirely unknown. In 1776 manufactories scarcely existed even in name in all this vast territory. In 1870 more than two millions of persons were employed in manufactories, producing more than two billion one hundred million dollars of products in amount annually—nearly equal to our national debt. From nearly the whole of the population of 1776 being engaged in that one occupation of agriculture, in 1870 so numerous and diversified had become the occupations of our people, that less than six millions out of more than forty millions were so engaged. The extraordinary effect produced in our country by a resort to diversified occupations has built a market for the products of fertile lands distant from the seaboard and the markets of the world. The American system of locating various and extensive manufactories next to the plow and the pasture, and adding connecting railroads and steamboats has produced in our distant interior country a result noticeable by the intelligent parts of all commercial nations. The ingenuity and skill of American mechanics have been demonstrated at home and abroad in a manner most flattering to their pride. But for the extraordinary genius and ability of our mechanics, the achievements of our agriculturists, manufacture and transportation throughout the country would have been impossible of attainment. The progress of the miner has also been great. Of coal our production was small; now many millions of tons are mined annually. So with iron, which formed scarcely an appreciable part of our products half a century ago, we now produce more than the world consumed at the beginning of our national existence. Lead, zinc and copper, from being articles of import, we may expect to be large exporters of in the near future. The development of gold and silver mines in the United States and Territories has not only been remarkable, but has had a large influence upon the business of all commercial nations. Our merchants in the last hundred years have had a success, and have established a reputation for enterprise, sagacity, progress and integrity unsurpassed by the people of older nationalities. This "good name" is not confined to their homes, but goes out upon every sea and into every port where commerce enters. With equal pride we can point to our progress in all of the learned professions. As we are now about to enter upon our second centennial, commencing our manhood as a nation, it is well to look back upon the past and study what will be best to preserve our present and advance our future greatness. From the fall of Adam for his transgression to the present day no nation has ever been free from threatened danger to its prosperity and happiness. We should look to the dangers threatening us, and remedy them so far as lies in our power. We are a republic whereof one man is as good as another before the law. Under such a form of government it is of the greatest importance that all should be possessed of education and intelligence enough to cast a vote with a right understanding of its meaning. A large association of ignorant men cannot for any considerable period oppose a successful resistance to tyranny and oppression from the educated few, but will inevitably sink into acquiescence to the will of intelligence, whether directed by the demagogue or by priestcraft. Hence the education of the masses becomes of the first necessity for the preservation of our institutions. They are worth preserving, because they have secured the greatest good to the greatest proportion of the population of any form of government yet devised. All other forms of government approach it just in proportion to the general diffusion of education and independence of thought and action.

On the morning of the 2d inst., Mr. A. G. Coes, of Worcester, Mass., was thrown from his carriage by his horse taking fright, breaking his neck and killing him instantly. Mr. Coes was a highly esteemed citizen of Worcester, and the senior member of the firm of A. G. Coes & Co., well known to the hardware trade as the manufacturers of screw wrenches.

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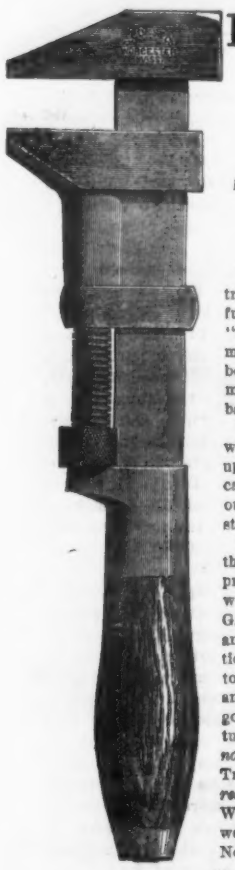

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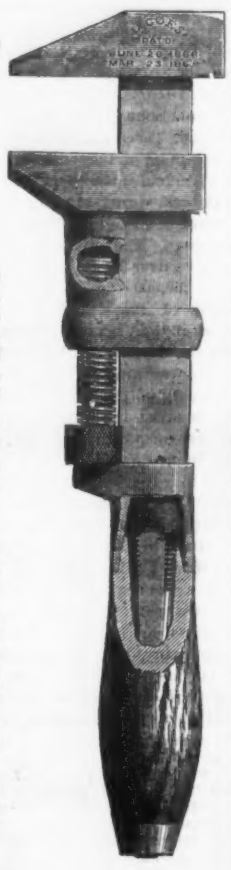

We invite the particular attention of the trade to our New Straight Bar Wrench, *widened*, full size of the larger part of the so called "reinforced or jog bar." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to *any* strain the bar may be subjected to.

These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

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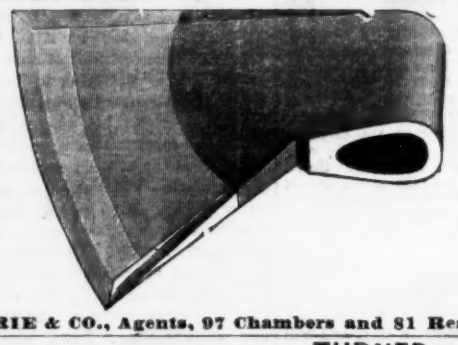

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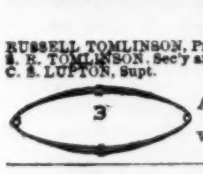

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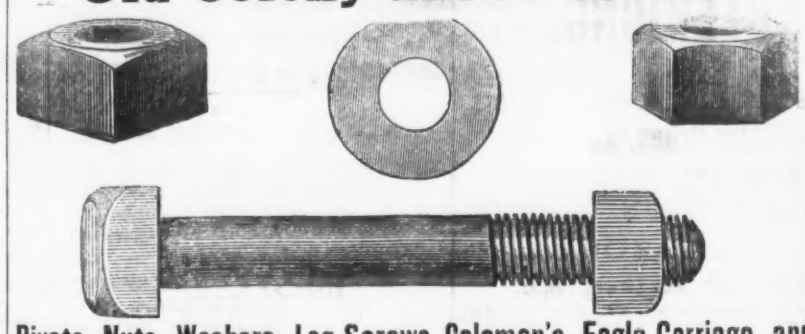

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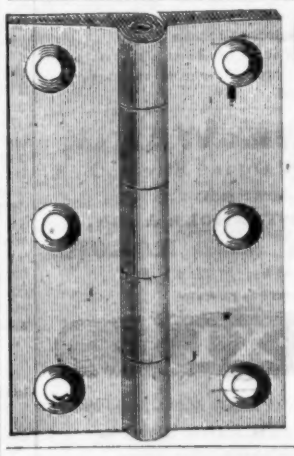

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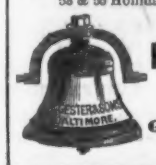

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The Iron Age.

New York, Thursday, December 9, 1875.

DAVID WILLIAMS - *Publisher and Proprietor.*
JAMES C. BAYLES - *Editor.*
JOHN S. KING - - *Business Manager.*

NEW YORK, January 2, 1875.

Until the 1st instant the postage on newspapers was paid by subscribers at the office where the paper was received, the yearly rates on the different editions of *The Iron Age* being as follows: Weekly, 40 cents; Semi-Monthly, 40 cents; Monthly, 24 cents.

Under the provisions of the new postal law, which went into effect on the 1st instant, prepayment at the office of mailing is required, at the rate of two cents per pound for the Weekly, and three cents per pound for the Semi-Monthly and Monthly, which will make the postage as follows on the different editions: Weekly, 50 cents; Semi-Monthly, 30 cents; Monthly, 15 cents.

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City Subscribers will confer a favor upon the Publisher, by reporting at this office any delinquency on the part of carriers in delivering *The Iron Age*: also, the loss of any papers for which the carriers are responsible. Our carriers are instructed to deliver papers only to persons authorized to receive them, and not to throw them in hall ways or upon stairs; and it is our desire and intention to enforce this rule in every instance.

CONTENTS.

The Conditions of Cheap Iron Manufacture in the South.

In our issue of last week we gave some interesting comparisons of the cost of making iron in the West and South, showing that, notwithstanding superior natural advantages, iron had not yet been made on a large scale in the South at prices which would enable it to be laid down in Pittsburgh in profitable competition with the product of Western furnaces. Even with these facts in mind, however, it seems probable that iron can be made cheaper in Tennessee and Alabama than in the West; but it is very evident that natural advantages will not offset the evils of bad location, defective construction and unskillful management. Chattanooga has certainly every appearance of being a very desirable point for the manufacture of cheap iron, but at yet we can only imagine what might be accomplished with a furnace like the Lucy or Isabella, if as well managed as is the present furnace in that city. If, for example, the Rising Fawn Furnace, with its costly and excellent plant, had been built in Chattanooga instead of where it is, 20 miles from that city, and had it been as well managed, financially, as the Chattanooga furnace is and always was, it would, we think, soon be determined whether or not "the iron makers of Pennsylvania "must pale their fires in the growing light "of Tennessee's resources."

Such a plant as that now at Rising Farm could be built and operated at this time for about $309,000, which is about $200,000 less than the owners of that furnace expended upon it. Suppose it had been built at Chattanooga. The company owning the furnace at that place now get the ore, yielding fully 50 per cent. of iron, at $2 per ton, and any other furnace at that point could probably do equally well. Then put coke at 8 cents, which is what the Chattanooga company are now paying, and we have the following comparison with the Lucy:

	Iron at Lucy.	First-class at Chattanooga.
Ore per ton of pig	$10·50	$4·00
Coke, 80 bushels	3·80	6·40
Total	$14·30	$14·40
Difference in favor of Chattanooga		3·90
Freight to Louisville or Cincinnati		3·65
Net difference in favor of Chattanooga		$0 35

Thus, assuming flux, labor and contingencies to be the same, we should have a difference in the cost of pig iron delivered in Louisville or Cincinnati, of not less than $1·50 per ton in favor of a first-class furnace at Chattanooga, counting the greater freight from Pittsburgh, while for every reduction of 1 cent. per bushel on the cost of fuel at Chattanooga, the difference in the cost of iron per ton is increased 80 cents. A good article of coke, selling at a cheap price is therefore the true solution of the problem of cheap iron making in the South.

The prospect of a cheap supply of coke from present sources is narrowed down upon careful investigation to the output of the mines of the Suwanee and Dade Coal Companies. The Ætna has a run on foundry coke, and the Coal Creek mines produce only gra e coals, beside being too far from Chattanooga by the present circuitious railroads. The Dade and Suwanee Companies' mines are both worked by Penitentiary convicts, and the cost of getting out coal has been reduced to a minimum; but both have costly railroads to maintain, with heavy grades; their coal is so slaty that they cannot make a first-class coke without washing, and neither of them has water enough within miles of their mines to do this, even to the extent of their present product. The Suwanee Company has an energetic and enterprising management, and to them is due the credit of having materially lessened the price of coal in Chattanooga. The mine is located on the Cumberland tableland, from which the lower level is reached by a railroad with grades as steep as 190 feet to the mile. To maintain and operate this road involves a heavy annual expense. It is 23 miles long and connects with the Nashville and Chattanooga Railroad at Cowan's depot. From this point to Chattanooga is 64 miles, and in some places grades of 90 feet to the mile must be overcome. The Suwanee Company delivers coal at Cowan at a cost, as stated in the president's report, now before us, of 5·77 cents per bushel of 80 pounds; thence to Chattanooga the freight is not less than one cent. per bushel, making the cost of the coal delivered in Chattanooga 6·77 cents. The cost of coke delivered at Chattanooga is somewhat greater, as it is so friable from slate that it breaks to pieces badly, and any loss of net weight on this account is deducted by the furnace company, which amounts to enough to bring the cost of their coke up to seven cents. The Suwanee Company have a bonded debt of $200,000, and it is not possible that they will even be able to manufacture cheap coke for the Chattanooga market. The Dade Company work the same vein as the Suwannee, but at their mines it is a little more slaty. They have a narrow gauge railroad of the Switchback type, to descend the mountain about 800 feet in two miles air line distance, and at the terminus of this road the coal is dumped into cars running on a broad gauge road, also owned by the company, and carried six miles to Shell Mound Depot on the Nashville and Chattanooga road. They claim to be able to deliver coal or coke at Shell Mound at a cost of six cents per bushel; but they cannot place either in Chattanooga cheaper than the Suwanee Company, while the quality of the product is not quite so good. The Dade Company has a debt of $200,000, and has issued stock to an equal amount. For the coal mined it pays a royalty of half a cent per bushel for fifteen years. With these facts in mind, it is evident that neither of these companies is in a position to supply abundant and cheap coke at Chattanooga, as they have already reduced their expenses to the lowest point, and cannot adopt any system of management which will offset an inconvenient location and costly transportation for their product. We conclude, therefore, that before Chattanooga can profitably compete with Pittsburgh in the Ohio River markets, special facilities for obtaining cheaper coke and coal must be provided. When a company with large capital is formed to own and operate coal and iron mines, which can guarantee to the iron masters of the North and of Europe that furnaces built at Chattanooga shall have ore of at least 50 per cent. grade at $2 per ton, and good coke at seven cents per bushel delivered, there will be a surer prospect of the realization of the vision of "the smoke from a hun-"dred furnaces wreathing its way around "the frowning cliffs of Lookout Moun-"tain."

The probable source of cheap coal and coke for Chattanooga lies northward, along the line of the Cincinnati Southern Railroad. This road extends directly south from Cincinnati to Danville, Ky., and thence across and over the Cumberland plateau, through the Emery Gap with the Emery River, and thence down the valley to Chattanooga. The steepest grade on the route is 60 feet to the mile, and between Emery Gap and Chattanooga not more than 30 feet to the mile. Its proper route should, we think, have been to Coal Creek and thence down the valley, as by that line it would have touched the spot where the greatest thickness of the Tennessee coal is found, in locations most favorable to cheap working. At Winter's Gap, for example, the steep, wall-like spur of the Cumberland known as Walden's Ridge is cut through by the three head streams of Poplar Creek, thus giving easy access to the horizontal veins of the Cumberland field even as far back as the Great American Knob, while the never failing streams afford ample power and abundant water for washing coal. In the Cumberland strata here are found seven horizontal seams of workable coal above the water level, the least of which is three feet thick; and on Walden's Ridge are five more, two of which are known to be workable—one, the famous Rockwood seam, lying at an angle of 35°. The Oakdale Furnace was built to use this coal raw, but for some reason half raw and half coke was used. The horizontal seams consist of coals resembling the block coals, and are unsurpassed as grate coals. One is a compact, dry coal, stated by Professors Maynard and Bradley to be well adapted for use, raw, in the blast furnace. The price for mining at Coal Creek is 2½ cents for run of mine and 3 cents for selected lump coal. The three-foot vein is similar in appearance to that from which the very compact Etna coke is made, but at Poplar Creek it contains only a trace of sulphur. The seven foot vein—E of Bradley's and H of McFarlane's classification—is probably the same as that worked at Coal Creek, but is practically free from sulphur and slate.

From Winter's Gap to the Cincinnati Southern Road, where it enters the valley, is 16 miles, and a connection could be made with their mines by a road having an even and moderate down grade—not over 30 feet to the mile. Such a road would place these desirable coals within 96 miles of Chattanooga by rail, and they could be delivered in that market at rates low enough to make that city, in fact, "the Pittsburgh of the South." Should such an enterprise be undertaken by men with ample capital, able and willing to do a large business for small profit, to include mining, coking and transportation, with a view to the rapid development of the iron industries of the Southwest, the dream of cheap Tennessee iron competing successfully and profitably with Northern irons in markets common to both, will undoubtedly be realized. The trouble with most Southern enterprises thus far undertaken has been an over strong desire for a large profit upon a small business and light investment of capital. Such an undertaking as that we have suggested, looking to the development of the only sources from which a supply of cheap coal and coke of the best quality can be obtained, will require a liberal investment, and the profits will be small, until a larger consumptive demand has been built up by the establishment of more iron works and factories in and about Chattanooga. It must be undertaken, if at all, primarily with the object of building up the manufacturing industries of the Southwest, and not with a view to the establishment of a small business conducted with a view to the earning of a large profit. In a word, it is an undertaking which demands capital, enterprise, judgment and a faith in the future, and could be best begun and carried out by Southern men, who believe in the ability of the South to achieve industrial greatness. "Fancy engineering" should be avoided, and the work of development, and the construction and equipment of the necessary railroad connection with the Cincinnati Southern should be entrusted to engineers who will not spend the company's money in experiments made for their own glory. Coke ovens of the best pattern and construction must be provided, and the entire plant of the company should be first-class. We offer these suggestions for the consideration of Southern capitalists.

Our Export Trade to Non-European Countries.

The limited consumption of the past two or three years, resulting as it has in an excess of production in many varieties of commodities over the present requirements of the country, has had the immediately beneficial effect of stimulating the efforts of our manufacturers to seek a foreign market for their wares. The largest and most promising fields for this kind of enterprise are found in Spanish America, Brazil and the British colonies, there being but little opportunity for a general export trade in manufactures in Europe. The shrinkage of values in the home markets has enabled our merchants and manufacturers to compete successfully with goods of European make; many new markets have been found, and a great variety of articles not hitherto exported in large quantities have been shipped of late on a more extensive scale. Machinery, locomotives, hardware, tools, cutlery, sewing machines and agricultural implements have thus found a profitable foreign market, and the quantities thus placed to advantage in exchange for the raw material of those countries would have been still greater but for the semi-panic which, since the commencement of summer, has overtaken several of them in response to the large and continuous London failures.

Previous to our own panic it was deemed an easy matter to raise money in London and elsewhere in Europe for the establishment of banks, the building of railroads, and the working of old and new mines almost anywhere in Spanish America and Brazil. But the London failures since summer, involving branch and other firms out there, disclosed a history of frauds, extravagance and ill-advised investments, more particularly in Central America, and Spanish American undertakings of a similar character are, for the present, virtually excluded from European credit in any shape. Add to this several revolutions on the River Plate and in Central America, the financial crises which inevitably follow them in the disturbed countries, and the impression produced on the minds of capitalists and merchants in general has been anything but a favorable one, so far as Spanish America is concerned. To a certain extent our own trade with those politically or financially disturbed countries has suffered from it likewise, and our export to the Argentine Republic, and to Uruguay especially, has been considerably lessened in consequence. With other countries we have continued to deal extensively, as heretofore, especially with Cuba, in spite of the insurrection, with Mexico, Venezuela, Brazil, Chili and Peru.

While, therefore, our intercourse with the River Plate and Central America has diminished somewhat, other more distant countries have been drawn into more intimate and extensive commercial relations with us, and strange to say, we have selected those in which British competition was of all the most difficult to overcome—for example, the Cape of Good Hope, New Zealand and Australia. From the moment that hardware, cutlery and tools of American manufacture declined to prices favorable to exporters, our merchants have more vigorously than ever before cultivated relations with those productive countries, colonized and inhabited by a thrifty population of Englishmen and their descendants, who know how to use and appreciate American manufactures of iron and steel, and the success which has attended their endeavors has been a most signal one. We have in those markets begun to displace English and Continental goods, the colonial consumers being delighted with our assortments.

As an illustration of the popularity of American goods in colonial markets, we quote as follows from the letter of an agent of one of the Birmingham firms in Melbourne, Australia, published in a recent issue of the *Ironmonger*: "You will notice "that our indent runs more on American "ironmongery than formerly. Their goods "are far superior to English made, and "latterly they have been much cheaper. "There is no comparison in the profits they "pay us, and they give universal satis-"faction. Small wares, tools, &c., in-"deed, all sorts of American-made goods, "are now being sold in the market, and "when once used, seen, or sold, the user "or buyer will never again look at Eng-"lish-made articles of the same class."

It is not likely that our manufacturers will be willing to lose even the slight advantage thus gained. On the contrary, every effort will be made during the coming year, especially through the agency of the Centennial Exhibition, to extend and render permanent our foothold in foreign markets. Facilities of communication with Australasia and Oceanica, *via* San Francisco, are now better and more frequent than they have hitherto been, for during the first week of each month we can ship and write to those countries from this coast, by a direct route, all steam, and save a distance of 1500 miles. It is now very evident, we think, that a rapid and sustained development of our manufacturing industries depends upon a large export. We have reached a turning point in our industrial history, and unless we can extend our export trade there must be a curtailment of our manufactures until the growth of the country shall have increased the legitimate and healthy consumptive demand, to an extent which shall equal our present producing capacity. This is an unpleasant fact, perhaps, but there is no gainsaying it, and it is the part of wisdom to realize the situation and take advantage of every opportunity now offered to establish our goods in such foreign markets as are open to us. All things considered, our Centennial Exhibition will be most timely.

The continuation of Mr. Wm. J. Fryer's valuable article on architectural iron work, has brought us this week to one of the most interesting and important discussions of the subject. It consists of the complete specifications of a contract for an iron building, fully illustrated and accompanied by a great deal of tabulated information which will assist the contractor in making his estimates on an exact basis of cost. Information of this kind has never before been given to the public, and it will be found of great value to a large class of our readers, who usually find very little relating to their business in the technical journals.

In a recent issue we published an article on the industrial development of Japan, in which an extract from the *Japan Mail* was printed, with a few words of general approval. The extract, giving a condensation of a consular report by Mr. Annesly, British consul at Hiogo and Osaka, came to us from English sources, and was given by us as a quotation from the *Japan Mail*—the fact that the English journal first publishing it had interpolated a few words of its own, escaping our notice.

The Cost of Iron at the Lucy and Rising Fawn Furnaces.

GLENDON IRON COMPANY,
EASTON, PA., Dec. 6, 1875.

To the Editor of The Iron Age: DEAR SIR—I have read with some interest your article of Dec. 2d on the manufacture of iron in the South, and agree with you that there have been too many glowing pictures of what could be done there. At the same time, I think that your comparison between the Rising Fawn and Lucy furnaces is not as fair and accurate as you intended it to be. I notice that you do not put down any limestone as being used at the Lucy Furnace. I do not know the amount really used, but on turning to Mr. Bell's notes on the amount of limestone used at Pittsburgh, I find it stated at 15 cwt. to a ton of pig iron, and costing 5/8 to 6/9 a ton—say, $1·50 per ton. You state the Lucy Furnace ore to average 60 per cent., and the fossiliferous iron limestone at Rising Fawn to average 40 per cent. of iron, but you have omitted to state that the latter requires no limestone to be added to flux it; therefore that expense is saved, and thus it takes no more ore and limestone to make a ton of pig iron at Rising Fawn than at Pittsburgh. Further, you take it for granted that it will take as much coke to smelt 2¼ tons of Rising Fawn ore as to smelt 2¼ tons of Lucy ore and limestone, which, taking into consideration the intimate mixture of the ore and flux at Rising Fawn, I am convinced cannot be the case. I should not be surprised to find that Rising Fawn is making a ton of pig iron with 50 bushels of coke or less; I think that 60 bushels must be ample. You say, also, that the Lucy makes 600 tons a week, and the Rising Fawn 280 tons, and that there is *consequently* a great saving in labor for the Lucy. I cannot see how this assumed consequential saving can exist, as it takes as much material to make a ton of iron at one as at the other. It seems plain to me that if the Lucy makes twice as much as the Rising Fawn, there must be twice as much material to be moved, and, consequently, twice as much labor required to move it. As wages are lower in the South than at Pittsburgh, the labor question is in favor of the South. The following estimate probably approximates more closely than yours to the relative cost of making pig iron at Pittsburgh and the South:

	Lucy.		Rising Fawn.
Iron ore	$11·25		$5·00
Limestone	1·13		...
80 bushels coke	3·80	60 bush. coke,	6·00
	$16·18		$11·00

Respectfully,
WM FIRMSTONE.

[In our comparative estimate of the cost of ore

and fuel used at the Lucy and Rising Fawn furnaces, we took no account of limestone, nor did we include interest, labor or contingencies. Consequently, our estimate was not intended to represent the cost of a ton of iron, but only the cost of the ores and coals. The omission of a charge of $1·50 per ton for limestone against the Lucy, is more than offset, in a comparison with the Rising Fawn, by the saving in labor upon the larger product of the former. Mr. Firmstone does not understand how this can be, which, we confess, surprises us. The Lucy makes, say, 600 tons per week on an average. The Rising Fawn has never made more than 280 tons. Now we grant that, to raise the stock needed to charge the Lucy, takes more labor than to raise the stock needed to charge the Rising Fawn, but it does not take many, if any, more men. With good management, we think the force of men necessarily employed about the latter could run the former. Granting, however, that a few more laborers were required, a great saving on a large product over a small one comes in on the cost of superintendance, clerk hire, engineers' wages, &c. We think it requires no argument to show that there is a saving in labor on a product of 600 tons over a product of 300 tons, provided these amounts are, in each instance, the yield of one stack. Were it possible to increase the yield of the Glendon Furnace by 50 per cent., we are very certain that Mr. Firmstone would find that the charge per ton, for labor, against the product, would not be 50 per cent. greater than now.

With regard to the coke consumption per ton of iron in the two furnaces, Mr. Firmstone is clearly mistaken. We do not know exactly how much coke the Rising Fawn uses per ton of iron, but as 90 bushels are required in the Chattanooga Furnace, we do not think it probable that the Rising Fawn can use much less than 80 bushels. There is no furnace in the South that has ever made a ton of iron with less than 80 bushels of choice, selected coke, and none has ever made it with 60 bushels under any circumstances. The Rising Fawn might, possibly, make iron with a consumption of 60 bushels of Connellsville coke per ton, but none of the cokes made from the Tennessee coals at present used have sufficient body to admit of such economy.

With regard to wages, Mr. Firmstone is again mistaken. Mere manual labor is cheaper in the South than at Pittsburgh, but skilled labor is not; consequently, it cannot be said that the labor question is much, if any, in favor of the South, especially as the unskilled Southern labor requires more superintendence. With regard to Mr. Firmstone's estimates of cost at the Lucy and Rising Fawn, we can only say, that if the difference in favor of the latter were half as great as he makes it, the Rising Fawn iron could be delivered in Pittsburgh and sold at present prices at a profit of $2 per ton. This would be good news to the Southern furnace owners.—*Editor Iron Age*].

New Publications.

THE ELEMENTS OF GRAPHICAL STATICS IN THEIR APPLICATION TO FRAMED STRUCTURES, with numerous practical examples of cranes, bridges, roof and suspension trusses, braced and stone arches, pivot and draw spans, continuous girders, &c: together with the best methods of calculation, and containing, also, new and practical formulæ for the pivot or draw span, braced arch, continuous girder, &c. By A. Jay Du Bois, C. E., Ph. D. New York. John Wiley & Son. Price $5.

This work comes to us in one volume 8 vo., with an atlas of 32 plates. It is the first complete presentation of the subject which has yet appeared in English. The general principles are first given, and then the various practical applications. Among these the complete solution of the continuous girder is for the first time given, both graphically and analytically. Here the method of solution is eminently practical and perfectly analogous to that for the ordinary girder of single span; which latter is, in fact, but a particular case of the more general problem. The formulæ are new, simple, and of general and ready application. Practical examples, both of continuous girders and draw spans are worked out in detail, and attention called to every point of importance. The economy of this class of girder, amounting to from 30 to 50 per cent. over the single span, is demonstrated.

So also with respect to the braced arch—a thoroughly scientific and practical method of solution, is, for the first time given, which gives accurately the strains in every piece with ease, simplicity and rapidity, and without intricate formulæ or tedious calculation. Here again practical examples illustrate the method in detail, and call attention to every point of importance. The same may also be said of the stone arch. Thus, these three important structures, the first of which has even been pronounced "too complex for mathematical investigation," are brought fairly within the reach of the practical engineer and student of engineering. In these respect alone the work forms an important and valuable contribution to engineering literature.

For every variety of bridge girder of single span, suspension and roof trusses, cranes, etc., a method of solution is given of easy, rapid and general application, fully illustrated by practical examples. Together with the graphic methods, the best methods of calculation are also given. "Ritter's method" of sections or moments is shown to be of universal application, and is applied to every structure treated of in the work, in detail, thus checking the results of diagrams. The methods by composition and resolution of forces are also fully explained. Thus, the work forms a complete Treatise upon Bridges and Roofs, with graphic and algebraic methods of calculation of the strains in every structure that occurs in engineering practice. The graphic method is also applied to solid beams or plate girders, to the determination of the center of gravity and moment of inertia of areas, as well as to several problems in practical mechanics. The work is specially designed for School Instruction, and forms, also, by reason of its completeness and the number of its practical examples, a book of reference for the Practical Engineer as well. It is furnished with an Historical Introduction, with complete lists of literature upon Graphical Statics and the Continuous Girder, and with a complete alphabetical index.

The work comes to us well recommended by Professor S. E. Warren, Dr. V. Wood, W. P. Trowbridge and others, and the praise it has received commends it to the favor of all who are interested in the subject of which it treats.

TEACHERS' MANUAL FOR FREE-HAND DRAWING IN PRIMARY SCHOOLS. By Walter Smith, Art Master South Kensington; State Director of Art Education for Massachusetts. L. Prang & Co., Boston. 171 pages.

TEACHERS' MANUAL FOR FREE-HAND DRAWING IN INTERMEDIATE SCHOOLS. By Prof. Walter Smith. Second volume of the series. L. Prang & Co., Boston. 200 pages.

No more valuable contributions to the industrial literature of the country has been made for many years than this series of works. The drawing which these works are intended to teach is precisely what is needed by every artizan whose product has any decoration or ornamentation whatever. While the ordinary course of drawing is intended to develop the student into an artist, leaving the application of art to industry to be found out by accident or blind groping, this of Prof. Smith undertakes to teach industrial drawing practically, so as to be at once available to the manufacturer. It is to be observed, as characteristic of this course of drawing, both in its primary and advanced grades, that the picture element, as such, is entirely left out. One of the leading objects is to teach proportion, the simple figures of plain geometry and the principles of design, and, at the same time, to familiarize the pupil with beautiful forms. While our hardware and notions are working their way into many foreign markets on account of their convenience and adaptation of means to ends, yet when we attempt in any way to ornament them, we fall far behind behind the ornamental work of other countries. It is to the teaching of practical industrial drawing, as applicable to just such things, that these works are devoted. They take up the elementary principles, and lead the pupil on, till, in the advanced works of the series, the higher forms of decorative art are attempted. The primary volume is adapted to the capacity of even the youngest of beginners. In the matter of teaching, the works are so arranged that it is not necessary for the teacher to be an expert in drawing. Self-teaching is even possible, and we should advise every manufacturer of hardware, and, in fact, of anything which is ornamented, to obtain copies of these books, and also of some pamphlets on the same subject, by the same publisher, and read them carefully. They are full of suggestions and information bearing upon the subject, and are profusely illustrated. Professor Smith, the author, was for a long time connected with the famous South Kensington Museum, England, and is perhaps better fitted to bring out a series of text books on this subject than any man living. He has certainly succeeded in producing the best work of the kind that has yet been given to the public, either in this country or England, and while we have cause to regret that we are so far behind the rest of the world in our art education, we can congratulate ourselves that, through his labors in this country, we are now moving in the right direction.

Ultimate Capacity of Blast Furnaces.

BY MR. C. COCHRANE.

In a paper read before the Institution of Mechanical Engineers, in 1869, "On the Further Utilization of the Waste Gas from Blast Furnaces, and the Economy of Coke due to Increased Capacity of Furnace," the writer ventured upon the prediction that by increased capacity of furnace from 20,624 to 47,528 cubic feet, the consumption of coke might be reduced to 17·9 cwt. per ton of No. 4 iron made in the Cleveland district, under the conditions of quality of materials and temperature of blast described at the time; and it was expected that this saving would result solely from the further absorption of sensible heat from the gases then escaping at the tunnel at a temperature of 560° Fah., the calcined ironstone containing about 40 per cent. of iron, and the blast being supplied at a temperature of 1000°. In a subsequent paper read in 1870, the writer (profiting by the valuable aid rendered by Mr. Bell in first attempting to lay down a curve which should at once embody at a glance known facts as to effects of capacity of furnace) further ventured to reduce his experience of large-sized furnaces and high temperatures of blast to general conclusions in the shape of definite curves, showing the saving due to heat of blast in a furnace of 20,624 cubic feet capacity, and showing the further saving due to capacity of furnace. To these curves constant reference will be made in this paper, as the writer believes that they are still (as then he believed them to be) practically true, and that every divergence from them can be satisfactorily accounted for in the facts about to be presented.

Since that time the writer has had the experience of two furnaces of very large capacity, the first being 90 feet high by 29 feet bosh, and possessing a capacity of 33,140 cubic feet; the second being 90 feet by 30 feet, and possessing a capacity of 40,500 cubic feet. As regards the latter furnace, owing to insufficient power of blast and irregularity of supply of materials, no definite confirmation of anticipated results was obtained. The pressure of blast rarely reached 3 lbs. per square inch, and for many months of the period did not exceed 2½ lbs., a pressure which was inadequate to prevent the frequent and almost constant formation of scaffolds at all the furnaces, ending at length in the complete stoppage of the one of largest capacity, after having only been at work for a period of two years; and the narrow escape of two other furnaces, each of 20,624 cubic feet capacity, from sharing a similar fate.

It may be interesting to compare the working of the furnaces of different capacities over the years 1871 and 1872, to show how, in all alike, similar disappointment arose, and how, under similar conditions, the economy due to increased capacity failed to assert itself. The reason for this the writer hopes to show in the present paper. In the table are shown the details of the working of No. 2 furnace of large capacity (40,500 cubic feet) over the year 1871. In nine months ending December, 1871, there were consumed at this furnace 22·75 cwt. of coke per ton of No. 4·18 iron, the temperature of blast being 1142°, and that of the escaping gases 505° + say 100° = 605°. In nine months ending December, 1871, there were consumed at No. 3 furnace, of 20,624 cubic feet capacity, 23·22 cwt. of coke per ton of 3·74 iron made, the temperature of blast being 1355°, and that of the escaping gases being 598° + 140° = 738°. In the former case the consumption should only have been, according to calculation, 20·50 cwt., whilst in the latter it should only have been 20·40 cwt., according to the data given in the paper of 1870. In nine months ending December, 1871, there were consumed at No. 4 furnace, also of 20,624 cubic feet capacity, 23·51 cwt. of coke per ton of 4·08 average quality of iron made, the temperature of blast being 1328°, and that of the escaping gases being 583° + 140° = 723°. In this case the consumption of coke should only have been 20·55 cwt., according to previous experience of similar temperature at the same furnace. The average working of Nos. 3 and 4 furnaces, during the nine months of 1871 referred to, was

Coke consumption 23·36 cwt. per ton of $\frac{3·74+4·08}{2}=3·91$ iron

Temperature of blast $\frac{1355+1328}{2}=1341°$.

Temp. of escaping gases $\frac{738+723}{2}=730°$.

For the moment, these results would seem to point to the conclusion that temperature of blast, and capacity of furnace, after a certain dimension was reached, would be simply replaceable items in the working of a blast furnace; for notwithstanding a reduction in temperature of blast of 199°, the consumption of coke was 22·75 cwt. in the larger, against 23·36 cwt. as the average of the two smaller furnaces, of nearly 20,000 cubic feet less capacity. It will hereafter be shown, however, that the heavy scaffolds, to which the large furnace was constantly subjected, reduced in effect its working capacity to one of about 18,000 cubic feet, whilst Nos. 3 and 4 furnaces worked no better than furnaces of 10,000 cubic feet capacity should do.

Somewhat better results attended the working of the large furnace of 40,500 cubic feet capacity during the year 1872, but on the average of the year's working still fell considerably short of what was expected. In eleven months, ending November, 1872, there were consumed 21·41 cwt. of coke per ton of 4·31 iron, the temperature of blast being 1195°, and that of the escaping gases 368° + 60° = 428°. By way of comparison, it may here be stated that at the smaller furnace, No. 3, during the twelve months of the year there were consumed 24·20 cwt. of coke per ton of 4·00 average quality of iron made, the average temperature of blast being 1133°, and that of the escaping gases 546° + 140° = 686°. No. 4 furnace, also of 20,624 cubic feet capacity, during the same period consumed 24·36 cwt. of coke per ton of No. 3·99 iron, the average temperature of blast being 1143°, and that of the escaping gases 544° + 140° = 684.

The estimated average for the largest furnace, working at 1195° should have been only 19·50 cwt., according to expectation: thus showing an excess in consumption of 1·91 cwt. per ton of iron, and reducing the effective capacity of the furnace to 21,000 cubic feet, according to the heat and capacity curves. In a similar way Nos. 3 and 4 furnaces should have worked with only 22·20 cwt. and 22·00 cwt., at the temperature of 1133° and 1143° respectively: showing an excess in consumption of 2·00 cwt. at the former and 2·36 at the latter, the effective capacities of the furnaces in these cases being respectively 18,000 and 12,500 cubic feet. The best result attained during 1872 at No. 2 furnace was in the month of April, when, with blast at a temperature of 1385°, the consumption of coke fell to 18·93 cwt. per ton of iron of an average quality of 3·59; the recorded temperature of the escaping gases over the month being 456°, when the effective capacity of the furnace rose to 31,000 cubic feet.

During 1873 there was no opportunity of contrasting the working of a large furnace of such capacity as that of No. 2 with the two others, each of 20,624 cubic feet capacity; but the result of the year's working showed at the furnaces of lesser capacity a uniformity which may be worth while to record. No. 3 furnace worked with an average temperature of blast of 1238°, and consumed 23·10 cwt. of coke per ton of iron made of 3·78 quality; whilst No. 4, of equal capacity, worked with an average temperature of 1254°, and consumed 23·20 cwt. of coke per ton of iron made of 3·86 quality; the temperature of the escaping gases at No. 3 furnace being 548° + 140 = 688, and at No. 4 furnace 596° + 140° = 736°. The coke averaged throughout the year 0·67 per cent. water, 7·31 per cent. ash, with sulphur 1·01 per cent., making a total of 8·99 per cent. of foreign matter. The iron stone contained about 40 per cent. of iron.

In March, 1874, No. 1 furnace, of 33,140 cubic feet capacity, was blown in, and worked with an average temperature of blast of about 1238° over a period of eight months, consuming 21·17 cwt. of coke per ton of iron made of 3·63 quality; the temperature of the escaping gases being 329° + 60° = 389°. The estimated consumption of coke should have been only 19·60 cwt., showing an excess in consumption of 1·57 cwt. No. 3 furnace, over ten months of the year 1874, worked with an average temperature of blast of 1315°, and consumed 23·64 cwt. of coke to produce 3·57 quality of iron, instead of 20·66 cwt., at which it ought to have worked according to previous experience; the temperature of the escaping gases being 572° + 140° = 712°. No. 4 furnace of 20·624 cubic feet, over the same ten months, worked with an average temperature of blast of 1261°, and consumed 23·92 cwt. of coke per ton of iron of 3·66 average quality, the temperature of the escaping gases being 584° + 140° = 724°. This is 3·02 cwt. per ton in excess of previous working of the furnace at the same temperature for a slightly higher number of quality of iron. The coke during the year averaged 0·63 per cent. water, 7·98 per cent. ash, and 0·80 per cent. sulphur, making a total of 9·41 per cent. of foreign matter.

During the period of four years, 1871 to 1874, there has been an excess in the consumption of coke at all the furnaces, ranging from 1·57 to 3·02 cwt. per ton of iron; in the cases of Nos. 3 and 4 furnaces the excess is above the actual results obtained at like temperatures of blast as indicated in the paper of 1870; whilst at No. 2 furnace of 40,500 cubic feet capacity the excess is above the estimated consumption based on calculation and shown by the capacity curves. That some common causes have operated to produce such excess at all the furnaces must be admitted, though it may be difficult to point out the precise cause or causes which have been in operation. The writer's impression is that the excess in consumption corresponds with a practical reduction in the effective working capacity of the furnaces, evidenced in the increased temperature of the escaping gases; the reduction in effective capacity being partly due to scaffoldings arising out of circumstances of inferior pressure of blast, or irregularity and inferiority of materials employed, specially as relates to their mechanical condition—and partly, as shown afterward, to the escape of gas through the sides of the furnaces. Taking the average working of Nos. 3 and 4 furnaces over the four years 1871 to 1874, the results are as follows:

			Temperature. Blast.	Temperature. Escaping Gases.	Consumption of Coke. Actual.	Consumption of Coke. Estimated.	Consumption of Coke. Excess.	Average quality of Iron.
Average	1874	No. 3	1315	712	23·64	20·69	3·02	3·57
		No. 4	1261	724	23·92	20·96	3·02	3·66
	1873	No. 3	1254	736	23·10	21·25	1·85	3·78
		No. 4	1238	698	23·20	21·10	2·10	3·86
	1872	No. 3	1133	686	24·20	22·20	2·00	4·00
		No. 4	1143	694	24·36	22·00	2·36	3·99
	1871	No. 3	1355	738	23·22	20·40	2·82	3·74
		No. 4	1328	719	23·53	20·66	2·87	4·06
		No. 2	1195	605	22·75	20·50	2·25	4·31
		No. 2	1142	605	22·75	21·10	1·62	4·18
		No. 2	1385	456	18·93	19·50	Deficiency 0·57	3·59
		No. 2	1251	711	23·65	21·15	2·50	3·88

It was recorded in the former paper of 1870 that the consumption of coke for No. 3·82 iron was 20·10 cwt., the temperature of blast being 1422°, whilst that of the escaping gases was 560°. A reference to the curves which accompanied the same paper shows that at 1251° the consumption of coke should be about 21·10 cwt., which agrees as nearly as may be with the estimated average above shown of 21·15 cwt.; so that there have been 2½ cwt. of coke consumed extra to what should have been, and accompanied with a rise in temperature of the escaping gases from 560° to 711°, or 151° rise. In one case the weight of gases escaping at the tunnel head corresponds with a consumption of 23·65 cwt. at 711°, and in the other with a consumption of 21·15 cwt. at 560°. According to Mr. Bell's estimate,* the weight of the escaping gases will be found as follows:

	Cwt.	Cwt.	
Coke consmpt'n per ton of iron		21·15	
Limestone		11·00	
Coke	21·15		
Less ash, etc., 8·59 per cent.	1·81		
Carbon in coke	19·34		
Carbon in limestone	1·32		
Total carbon per ton of iron	20·66		
Less that in pig	0·60		
	20·06		
Carbon in carb. acid from reduction of ore	5·98		
Carbon deposition	0·60		
	6·58	—carb. acid	24·13
Leaving carbon as carbonic oxide	13·48	—carb. oxide	31·45
	20·06		
Cwt.			
Using cwt. coke per ton of iron		21·15	
Carbon in gases 20·06	55·58		
Oxygen in gases 35·52			
Oxygen from ore and carbonic acid 12·45			
Difference from blast considered dry 23·07			
Nitrogen with this oxygen 76·92	76·92		
Weight of blast 99·80			
Weight of gases	132·40 cwt. = 3 ton of iron.		

To arrive at the weight of escaping gases with a consumption of 21·15 cwt., reference may be made to Gordon's translation of Gruner's work on blast furnace phenomena; and assuming the analysis of the gases to be the same as given there (page 46), though this is liable to a slight error, the calculation gives 126 cwt. per ton of iron as the weight of the moist gases escaping. Adopting in the following calculations the estimate of Mr. Bell, it is seen that at 560°, with the consumption of 21·15 cwt. of coke per ton of iron, the weight of escaping gases, after correction for impurities in the coke, would be 132·40 cwt. per ton of iron made. The weight of gases escaping in the case of 23·65 cwt. of coke consumed per ton of iron would be approximately

$$\frac{23·65}{21·15}\times 132·40=148 \text{ cwt.}$$

It follows that 15·60 cwt. more gas has escaped from the same furnaces than formerly, and at a temperature higher by 151°. Thus, in the worst case 15·60 × 112 = 1747 lbs. heated to 711° escapes in excess; while in addition 132·40 cwt. = 14,828 lbs. escapes at 151° higher temperature than the equal volume passing off from the furnaces formerly under more favorable conditions. The difference will therefore stand as follows when expressed in heat units:

	Heat units.
1,747 × 711 × 0·275 (specific heat) =	341,582
14,828 × 151 × 0·275 " =	615,732
Total	957,314

Taking 4000 heat units to represent 1 lb. of carbon burnt into carbonic oxide, the above 957,314 units represent 239 lbs. of carbon, equal to 261 lbs., or 2·32 cwt. of coke wasted, which fairly explains the difference of 2·50 cwt. indicated in actual practice. The writer can hardly think that greater accuracy could be expected in proof of the theory of absorption of sensible heat operating in furnaces of such a capacity as that referred to, namely 20,624 cubic feet. The increased temperature of the escaping gases corresponds, in his opinion, to a practical reduction of the capacity of the furnace from 20,624 cubic feet to something between 11,000 and 12,000 cubic feet; and he concludes that, as soon as the effective capacity can be increased to the full size of the furnace, the former excellent working will be restored; and the 2·50 cwt. consumed over the period referred to in excess of what should have been consumed will be got rid of.

Applying these considerations to the larger furnace of 40,500 cubic feet capacity, in 1871 the temperature of the blast was 1142°, and that of the escaping gases 605°. This high degree of temperature of the escaping gases, exceeding that of 560° at which furnaces of about half the size were wont to work, was notoriously due to irregular supply of materials, inferiority of quality and low pressure of blast, occasioning scaffoldings of a most formidable character, and making the successful trial of the furnace on its merits a sheer impossibility. Even here, however, it cannot fail to be noticed that, despite the disadvantages of the trial, the extra capacity more than compensated for the inferior temperature of blast by which 1·25 cwt. of coke was sacrificed. At Nos. 3 and 4 furnaces the average temperature of blast was 1331°, that of the escaping gases was $\frac{738+719}{2}=728°$, and the average consumption of coke was 23·37 cwt.; whilst at No. 2 furnace the average temperature of blast was 1142°, that of the escaping gases 605°, and the actual consumption of coke 22·75 cwt., thus proving itself better by 0·62 cwt. of coke, though working at 189° lower temperature of blast, showing a total difference in favor of No. 2 furnace of 1·87 cwt., but nevertheless showing that the large furnace, although of 40,500 cubic feet capacity, was only working as one of 17,000 to 18,000 cubic feet capacity, according to the heat and capacity curves; whilst Nos. 3 and 4 worked no better than furnaces of 10,000 to 11,000 cubic feet should have done.—*Iron.*

* "Chemical Phenomena of Iron Smelting," p. 186.

Lucius W. Pond's Forgeries.—The *Worcester Spy*, of Saturday, says: "A meeting of the creditors of Lucius W. Pond was held at the office of Hon. P. C. Bacon, Register in Bankruptcy, Thursday afternoon, on the petition of the assignee, William Dickinson, Esq., for the purpose of arranging for the disposal of the entire bankrupt estate at private sale. Mr. Dickinson stated that Mr. J. P. Hale, of New York, had offered $28,500 for their claims in full, Mr. Hale waiving all of his unsecured claims against the estate. After a general discussion of the proposition, it was voted unanimously to accept the offer, and the papers of transfer were made out yesterday, and were to have been signed last evening. By this arrangement all mortgages and taxes are assumed by the purchaser, and the affairs of the estate pass into private hands for further settlement, Mr. Hale, of course, being the principal owner. The number of raised, altered or reissued notes exceeds all anticipation, new lots coming to light nearly every day. Yesterday a lot of seven was handed into the Register of Bankruptcy, five of the number being altered notes, and two being on demand with indorsements, but as they were two years old, the indorsers cannot be held responsible. Many of the notes which have come in lately are held by people unacquainted with business paper transactions, and, having been personal friends of Mr. Pond, they think, of course, that their notes are among the good ones. The chemical test soon settles all doubt in the matter, and not one in twenty thus far has proved to be good. The Register in Bankruptcy wishes it stated that to entitle creditors to a dividend they must file their claims before him, and those holding 'Pond paper' cannot hand it in too soon.

The men at the Albany and Rensselaer Iron and Steel Works, says the Troy *Times*, are still in ignorance as to the amount of reduction which was to go into effect this week. Many express their disbelief in the notices of reduction. It is also thought by some that the reduction will not take place till something definite has been heard from the Burdens. It is almost positive that the Burdens will not reduce wages, and in this event there will probably be no reduction at any of the mills.

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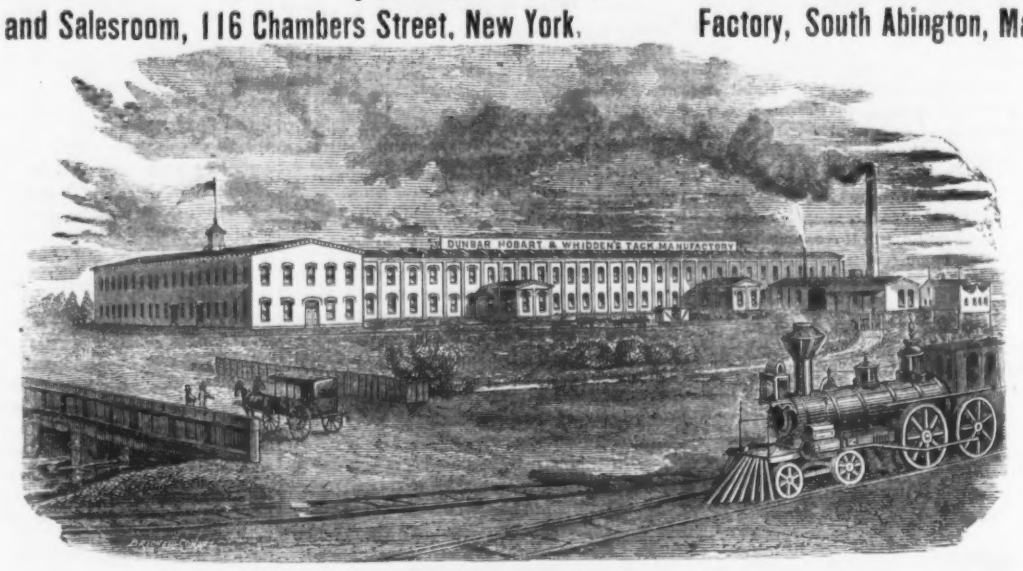

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Two sizes: Large Size Boring, ¾ to 3 inches; Small Size Boring, ½ to 1½ inches.

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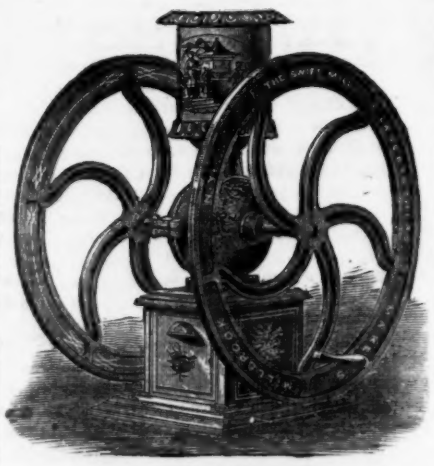

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Scientific and Technical Notes.

The *Popular Science Monthly* tells an interesting story of the very useful and practical employment of

A RAT IN THE TELEGRAPH SERVICE,

by means of which a very serious blunder was rectified: "A telegraph inspector of England recently pressed into his service a rat under the following peculiar circumstances: It was necessary to overhaul a cable of wires inclosed in iron tubes. A certain length of the cable had to be taken out of the tube, and the men commenced hauling at one end without having taken the precaution to attach to the other a wire by which it might be drawn back into the tube after inspection and repairs. The question arose as to how the cable was to be restored to its proper place; and here the ingenuity of the inspector was manifested. He invoked the aid of a rat-catcher, and, provided with a large rat, ferret and a ball of string wound on a Morse paper drum, he repaired to the opening in the tube. The "flush boxes" were opened and the rat, with one end of the string attached to his body, was put into the pipe. He scampered away at a racing pace, dragging the twine with him until he reached the middle of the length of the pipe, and there stopped. The ferret was then put in, and off went the rat again until he sprang clear out of the next flush box. One length of the cable was thus safe, and the same operation was commenced with the other; but the rat stopped short a few yards in the pipe and boldly awaited the approach of the ferret. A sharp combat here commenced, and it was feared that one or of both the animals would die in the pipe. But, after sundry violent jerks had been given to the string, the combatants separated; the ferret returned to his master, and the rat, making for the other extremity of the pipe, carried the string right through, and so relieved the inspector from his anxiety.

The frequent escapes of convicts from prisons and penitentiaries, even from those lately built at great cost, has called forth some comments from the press of this and other countries, and it is commonly believed that few cells are strong enough to hold the ingenious Jack Shephards of the present day, when they make up their minds to break out. To baffle the skill of these dangerous criminals, Messrs. Cook & Heath, of Memphis, Tenn., have devised and reduced to scientific application

A NEW SYSTEM OF PRISON CONSTRUCTION,

which has been covered by United States and foreign patents. The system combines strength with architectural beauty, and consists of several excellent features, which may be briefly described as follows: The cells are lined with the hardest cast iron, the doors, windows and frames, sashes being of one piece with perforations. As wrought iron is easily cut and filed, there is none of it used. The plates are connected without bolts or rivets. Any attempt of a prisoner to escape by cutting the walls of a cell is checked at once by the hollow wall system. The space in the wall, floor and ceiling is filled with kiln-dried sand, or other mobile material, which runs through an outlet by any opening that might be made, rendering it impossible for any prisoner to dispose of the same. An inexhaustible supply of this sand is furnished by a hopper constructed near the roof of the building or on top of the cells. Brick or wood walls, and single or double iron lining can be used for this system. In addition to the last mentioned plan, an alarm apparatus is connected with the sand, so that any noise or disturbance arising from cutting in any portion of the cell, is instantly heard in any part of the building. There is no limit to the number of places at which such alarms can be given simultaneously. Another plan of hollow columns supporting a number of cells, giving plenty of space below, is especially adapted to penitentiaries. The cells are disconnected from the main building by a drawbridge. The hollow columns concealing water and sewer pipes, oblique doors with perforations, give full view of interior of cells, without entrance, supplemented by sentinels. In general, the system is ample and complete in all its details, and is well worthy the attention of cities, counties, States and general governments requiring prisons of any grade of construction or cost.

The commission appointed by the Secretary of the Navy to consider the best route for the proposed

AMERICAN INTER OCEANIC SHIP CANAL,

have submitted a report to the President. The problem of connecting the two oceans has occupied the attention, as the report says, of statesmen, navigators and mariners for at least 375 years. The enormous saving of distance, time, cost and risk which it would give to the world has been carefully tabulated. There remains nothing to show but the feasibility of the route. This, the commissioners' report claims, has been done in the surveys made upon the Nicaragua route. The commission examined all the reports of surveys that have been made, Under the Darien route there are several distinct surveys: the Nap pi, recently reported in these dispatches by Lieut. Collins; the Caledonia, the Sasardi, and the San Blas. Beside these are the reports upon the Tehuantepec, the Nicaragua, and the Panama routes. The surveys of the Panama and Nicaragua routes were made by Capt. Lull, of the navy. Capt. Schufeldt, of the navy, surveyed the Tehuantepec route, and Capt. Selfridge, of the navy, the others. All these gentlemen were before the commission in its recent examination, and with maps aided in the explanation of the reports made by them. Upward of $60,000 has been already expended upon these surveys. It is now regarded as of the highest importance that the United States take some action at once to carry out the feasible plans of the ship canal, in order to prevent either France or England from coming in and reaping the honor and profit of this great enterprise. The result of this work cannot be fully estimated. The great saving in the carrying trade and the facilitating of the connections between Eastern Asia and Western America with Europe cannot be readily surmised. When the canal is completed nearly one-half of the carrying trade of the world will be revolutionized. The commission has made a most thorough examination of all the evidence before them, and warmly urge upon Congress the need of speedy action. Beside the testimony of the naval officers who have made the surveys, they had also the testimony of a civil commission made up of Messrs. Walton and Ammen, and Major McFarland, of the Army Engineer Corps, who have examined carefully the feasibility of a ship canal. In examining the various reports objections of an almost insurmountable nature were found in all but the Nicaragua route. It is a longer route than any of the others, with the exception, perhaps, of the Tehuantepec route, but its other advantages more than make up the bad feature of length. It is the only route where the climate is not dangerous to health. In the lower routes the malaria would destroy the greater portion of the workmen before the canal would be completed. It is the only route where a proper supply of water could be found, Lake Nicaragua upon this route being capable of furnishing a constant and uniform supply of water. The other routes are very defective in many other ways. They extend through a worthless waste of country that is impossible of development. The route through Nicaragua is represented as the paradise of Central America, and would return untold wealth under proper development. The cost of the ship canal *via* the Nicaragua route is thus recapitulated by A. G. Menocal, chief engineer of Capt. Lull's expedition. The total distance from the harbor of Greytown, or San Juan del Norte, is 181·26 statute miles. The cost for the canal for this distance is thus summarized:

Western division	$21,680,777
Middle division	715,658
Eastern division	25,080,914
Harbor of Brito	2,337,739
Harbor of Greytown	2,822,630
Total	$52,577,718
Add 25 per cent. for contingencies	13,144,439
Grand total	$65,722,147

English patents have been granted for a

NEW SYSTEM OF SINKING SHAFTS BY MACHINERY,

of which much is expected. The machine is a pick, so constructed as to make a vertical cut. Guide lines or rails are placed on a circular table of a somewhat less diameter than the shaft, and, while the cutter acts on the periphery of the circle, the machine travels forward and completely separates the center or core from the outer mass by a groove or ditch 2 in. in width, and to the depth of 12, 15, or 20 in., as may be most suitable. During the cutting of the ditch a light rock-drill is employed in boring a hole of the requisite depth in the center of the core, and when the cutting of the circle is complete, the table carrying the machine is elevated about 15 ft. by two compensating pulley blocks, the shot is fired, and in about five minutes the fillers are at work taking up the broken up core. The blasting is only of the nature of a lifting shot, and never cuts into the side or wall of the shaft, which is, in fact, left untouched by the action of the explosive. Where the work is in compact stone no lining of brick or masonry is required, and where the material is of a softer nature the sides remain in a perfectly undisturbed condition, and the lining process is effected more perfectly and in much less time than suffices where common sinking operations are carried on. It is calculated that where the machinery is made expressly for the purpose—the present being only altered coal cutting machines of old construction—an average of 12 to 18 yards per week will be done. At this rate a radical change will be brought about in opening new workings. The machine is driven by compressed air at about 30 lbs. pressure, and this will be a sensible relief to the men employed, and will diminish the danger from explosion or "black damp," often more than annoying in new sinkings.

The Western Union, and Atlantic and Pacific Telegraph Companies are laying

PNEUMATIC TUBES

from their offices in Broadway, in this city, and for other short distances, as a substitute for the telegraph. Preparations for the work have already considerably advanced. The former company expects to have the tubes in working order by New Year's day. There will be two tubes, each of which will consist of a lead pipe having 2¼ inches inside diameter, incased in an iron pipe, having an interior diameter of 3 inches, the latter being designed as a protection to the lead. The cylinders of the air pumps for compressing and exhausting the air in the tubes have a diameter of 35 inches. Messages from the main office will be dispatched by means of compressed air through one of the tubes, while those to be returned to the central office will pass through the other tube by exhausting the air, the engine, pumps and valves all being placed in the central office. The carriers are made of gutta percha, covered with felt cloth, the forward end being sufficiently enlarged to fill the tube, and thus prevent the passage of air in either direction beyond the carrier. It is calculated that the time occupied in sending a message from the central office to the office in Broad street will be about 25 seconds, while the arrangement will be such that one carrier, if necessary, can immediately follow another.

Experiments have lately been made at the City of Dublin Company's Works, Liverpool, with

A NEW COMPOSITE FUEL.

To determine the value of the process a quantity of North Wales coal was obtained, and part of it manufactured into the fuel; both the coal and the fuel were then handed over to Mr. Nicholson, manager of the City of Dublin Company's Works, to be tested in the well known experimental boiler attached to the works, and the trial (as is always the case there) was conducted solely under his directions and of Mr. Ferber, his assistant, and entirely independent of the patentee or anyone connected with him, and the following report of Mr. Ferber shows the result: Coal—Total water evaporated, 8000 lbs.; total coal consumed, 1036 lbs; total time employed, 4h. 10m.; coal consumed per hour, 248·64 lbs.; water evaporated per hour, 1920 lbs.; water evaporated per lb. of coal, 7·772; pyrometer heat in flues, 934; temperature of waste heat in chimney, 611·5; clinker per cwt. of coal, 6·117 lbs.; ash per cwt. of coal, 1·568 lbs.; stowage cubic feet per ton of coal, 44·062. Fuel—Total water evaporated, 8000 lbs.; total fuel consumed, 952 lbs.; total time employed, 4 hours; fuel consumed per hour, 238 lbs.; water evaporated per hour, 2000 lbs.; water evaporated per lb. of fuel, 8·403 lbs.; pyrometer heat in flues, 961·75; temperature of waste heat in chimney, 621.; clinker per cwt. of fuel, 4·571 lbs.; ash per cwt. of fuel, 1·428 lbs.; stowage cubic feet per ton of fuel, 33·658. This clearly shows that the fuel effects a saving in quantity, has greater evaporative power, greater heat, less clinker and ash, and stows in less space than coal by more than one-fourth. Mr. Ferber states: "This patent fuel is the best I have seen. It has very little smoke, stows away in less space than coal, and has very good heating properties, and I can, therefore, recommend it for marine purposes—No. 1 quality."

Formula for the Resistance of Iron and Steel.

BY PROF. LAUNHARDT, OF THE ROYAL POLYTECHNICUM AT HANNOVER.

Most engineers admit that the usual method of calculating quantities for iron structures is unscientific, and leads to waste of metal. The following investigations, based on Wohler's experiments, aim at establishing a system better in accordance with the present advanced state of engineering science:

Wohler found that iron is not only fractured by a single blow, sufficient to overcome the resistance of the metal at what he terms the limit of fracture, or fractural rigidity, b, but by a repetition of blows much under that limit. The farther the strain recedes from this limit, the more often must it be repeated to bring about fracture. This value is termed the working rigidity, a, of the material.

It was found, further, that this working rigidity is not a value constant under all circumstances; it becomes less according to difference of tension, d, of the material, *i. e.*, its elastic variation of form. This difference is at its maximum when, after each separate tension, the material returns completely to its original condition. Let us call the working rigidity which corresponds to this maximum, the original rigidity, u, of the material. If the material, after each strain, a, is not permitted to return to a condition of non-tension, but only to a maximum tension, c, so that it endures each time a difference of tension $d=a-c$, the working rigidity, a, becomes greater than the original rigidity u. If, now, the difference of tension be supposed gradually to decrease, so that the smallest tension, c, continually approaches the greatest a, the limit is reached of a differentation of tension, $d=o$, at which the material has to endure a uniform stress, cognizable as the limit of fracture, b.

The working rigidity, u, is thus seen to vary from the original rigidity, u, to the fractural rigidity, b, according to the range of the differentiated tension, $d=a-c$.

We have now to bring the working rigidity a, into dependence on the range of the play of tension, d; or, what comes to the same thing, to determine what differences of tension d, can be borne by the material when subjected to an infinitely often repeated strain, a; that is, to calculate the form of the co-efficient α in the equation $d=\alpha a$.

The simplest form of the co-efficient α, corresponding to either extreme respectively to which the working rigidity, a, passes—the original rigidity, u, or the fractural b—is given by the value $\alpha=\frac{b-a}{b-u}$, as in the following equation:

$$(1)\qquad d=\frac{b-a}{b-u}a.$$

If here $a=u$, then also $d=u$, and if $a=b$, then $d=o$.

It should be borne in mind that this form of the co-efficient α corresponds only to the two limits of rigidity above named. In order to ascertain whether the correctness of this equation (1) is established by the general result of Wohler's experiments, we will put it in another form. If c, as we have said, represents the smallest tension to which the material descends after each strain, a, then the difference of tension, $d=a-c$; and therefore,

$$(2)\qquad a-c=\frac{b-a}{b-u}a,$$

and consequently,

$$(3)\qquad a=\frac{u}{2}+\sqrt{\frac{u^2}{4}+c\,(b-u)}.$$

In this shape, however, the formula would have little practical value. Considering that c and a are the strains reckoned for a unit of surface, and, therefore, that c must remain undetermined until it is possible to make a transverse section of the parts of the construction, the equation cannot be used for finding the value of a, by which the transverse section itself has to be measured. Before the determination of the transverse sections the absolute values of c and a—the minimum and maximum strains for a unit of surface—are not known, but only their ratio $\frac{c}{a}$

Taking account of this, we deduce from equation (2) the following formula:

$$a=u\left\{1+\frac{b-u}{u}\times\frac{c}{a}\right\}$$

Let us represent $S\,max.$ the total strain which any part of a construction has to endure, and by $S\,min.$ the least strain, then since $\frac{c}{a}=\frac{S\,min.}{S\,max.}$ our formula can be thus written:

$$\text{I.}\qquad a=u\left\{1+\frac{b-u}{u}\times\frac{S\,min.}{S\,max.}\right\}$$

By means of the equation can be found the value of the working rigidity, a, which the material has for each unit of surface.

We have now to test this hypothetical formula, which we have proved only in the two extreme cases, by a comparison of the results shown in Wohler's experiments. To this end we give in the following tables a parallel of these results with those deduced from our formula. The fractural rigidity of east steel = 1100 cwt., the original rigidity 500 cwt. the square inch (Rhenish), so that the formula assumes the simple shape:

$$a=500\left\{1+\frac{S\,min.}{S\,max.}\right\}$$

Results of Wohler's experiments.

Variation of strain.	Minimum tension. $S\,min.$	Maximum tension. $S\,max.$
500	0	500
450	250	700
400	400	800
300	600	900
0	1100	1.00

Deductions from Launhardt's formula.

Variation of strain.	Minimum tension. $S\,min.$	Maximum tension. $S\,max.$
500	0	500
461	250	711
400	400	800
300	600	900
0	1100	1100

Of wrought iron, the fractural rigidity of which is 550 cwt. the square inch (Rhenish), Wohler finds the original rigidity to be 300 cwt., so that

$$a=300\left\{1+5\text{-}6\frac{S\,min.}{S\,max.}\right\}$$

A comparison of this formula with Wohler's experiment gives the following parallel:

Result of Wohler's experiments.

Variation of strain.	Minimum tension. $S.\,min.$	Maximum tension. $S\,max.$
300	0	300
200	240	440
0	550	550

Deductions from Launhardt's formula.

Variation of strain	Minimum tension. $S\,min.$	Maximum tension. $S\,max.$
300	0	300
197	240	437
0	550	550

Adapting these formulæ to metrical weights and measures, we have in kilogrammes for the square centimeter:

For wrought iron—

$$a=2190\left\{1+5\text{-}6\frac{S\,min.}{S\,max.}\right\}$$

For cast steel—

$$a=3650\left\{1+5\text{-}6\frac{S\,min.}{S\,max.}\right\}$$

The working rigidities yielded by these formulæ correspond to the tension limit at which fracture will follow an infinitely often repeated strain. For the sake of safety, the parts of a fabric are practically calculated for a tension much within this limit. Heed also should be paid to the fact that the actual strain may, in some cases, by unforeseen contingencies, the thrusting action of loads, etc., actually surpass the maximum calculated tension. An increase of the maximum tension changes greatly the proportion $\frac{S\,min.}{S\,max.}$. Multiplying, for safety sake, the calculated value $S\,max.$ 5·3, we have:

For wrought iron—

$$a=2190\left\{1+1\tfrac{1}{2}\frac{S\,min.}{S\,max.}\right\}$$

For cast steel—

$$a=3650\left\{1+1\tfrac{3}{4}\frac{S\,min.}{S\,max.}\right\}$$

It must further be taken into consideration that there may be defects in the material, that the section may become weakened by rust, that an equal distribution of the tension can seldom be looked for that the rigidity is influenced by such causes as *e. g.*, fresh riveting.

Every perforation has a weakening effect, not simply by an actual diminution of the section, but by the altered and unequal distribution of the strain upon the integral section, which follows the change in its form.

For these reasons a certain part only of the rigidity of the material is counted upon. Up to the present time about a fourth part of the fractural rigidity has been reckoned the right proportion of the resisting power, while Wohler allows the half of the working rigidity. Although this view of Wohler cannot well be disputed, and it receives the assent of most judgments, calculations in accordance with it would deviate very widely from tradition, so widely as to make improbable any general acceptance of Wohler's doctrine.

In this regard we may recommend that about one-third of the working rigidity be made the base of calculation, and therefore, for the square centimeter in kilogrammes:

II. For wrought iron:

$$s=800\left\{1+1\tfrac{1}{2}\frac{S\,min.}{S\,max.}\right\}$$

For cast steel:

$$s=1200\left\{1+1\tfrac{3}{4}\frac{S\,min.}{S\,max.}\right\}$$

The dependence of the working rigidity upon the difference of tension no longer remains as given in the foregoing formula, if the material is alternately subjected to pressure and tensile strain. If the material endures uniformly a strain of like character, a change in length follows at each application of the strain. This variation of length is composed of an inelastic one, the former disappearing completely with each period of cessation of strain, the latter remaining. Wohler found—and his results appear to have been confirmed by the researches of other experimenters—that the elastic alteration of length is entirely independent of the permanent, and, almost to the limit of fracture, in proportion to the amount of strain; in other words, that the modulus of electricity maintains a uniform value almost to the point at which fracture takes place.

A permanent change of length is first to be perceived when the strain has attained an amount which we term the limit of elasticity; after this, the permanent change increases in a greater proportion as the strain increases. Until the law of this increase can be stated, the value of the limit of elasticity can not be given with exactitude; it will depend very considerably on the degree of accuracy with which the experiments have been conducted. This will explain the varying statements made at different times concerning the amount of the limit of elasticity.

It is worthy of notice that, after a permanent change in length, iron passes over to a new condition of molecular equilibrium, in which, on repetition of the same strain, it does not undergo fresh longitudinal change, and shows no appreciable variation in its modulus of elasticity from its original condition. It follows that the prescriptive rule, not to employ materials for a strain surpassing the limit of their elasticity, is unfounded.

Proportions are altogether altered when the material is subjected alternately to pressure and tensile strain. If a girder be taken which has undergone tensile strain beyond the limits of its elasticity, and then acquired permanent extension, and be exposed to pressure, which also exceeds the elasticity, the permanent extension is destroyed, and a permanent compression takes its place. If this action is repeated, the material will experience continual molecular disturbances beyond the measure of the elastic variation of form, and these will permanently destroy it. Nothing further need be added to show that for alternately tensile and crushing strains a measure for the working rigidity has to be found in the limit of elasticity.

Wohler's experiments seem to establish this completely, since the strains which were endured in infinite repetition of alternate pressure and duction, correspond to the measure commonly given as the limit of elasticity—*i. e.*, for wrought iron, 160 cwt.; for cast steel, 300 cwt., the square inch (Rhenish), or, in kilogrammes for the square centimeter:

For wrought iron, 1168 kilometers.

For cast steel, 2190 kilometers.

The experiments are limited to the case where each strain, absolutely taken, is equally great; they give no elucidation of the method of obtaining the working rigidity if the strain is greater in one kind than the other. Until the results of exhaustive experiments are before us, we may act upon the rule accepted in America, according to which a certain strain is fixed as safe for the sum of the tensile and crushing strains, *e. g.*, for the square centimeter:

For wrought iron, 800 kilogrammes.

For cast steel, 1200 kilogrammes.

According to the principles above deduced, a trustworthy rule appreciable to mixed relations may be stated as follows:

(1) For parts such as axles, shafts, spindles, piston rods, cranes, etc., subjected to equal moments of crushing and tensile strain:

Wrought iron, 400 kilogrammes.

For cast steel, 600 kilogrammes.

(2) For parts subjected alternately to vertical and tensile strain in unequal proportions, the sum of the strains must be 800 kilogrammes for wrought iron and 1200 kilogrammes for steel.

(3) For parts which after each strain return to a condition in which there is no strain, and for which, therefore, in the formula $S\,min.=0$, we have:

For wrought iron, 800 kilogrammes.

For cast steel, 1200 kilogrammes.

(4) For parts which have to resist spans varying from a fixed minimum strain, $S\,min.$, to a maximum strain, $S\,max.$, as many parts of the main girders of iron bridges, one has to choose for the unit of surface, the allowed tension on pressure according to the formula II.

In most parts of the main girders of iron bridges, the relation of the minimum and maximum strains $\frac{S\,min.}{S\,max.}$ is proportioned to the relation of weight of material in it for the whole load. This relation can according to experience be set for a bridge of L meter span at $0{\cdot}09+0{\cdot}0045$ L, so that replacing $\frac{S\,min.}{S\,max.}$ by these values, the material is, in main girders of iron bridges, subject to a tension on pressure:

For wrought iron, $856+1{\cdot}8$ L kilogrammes at the square centimeter.

For cast steel, $1254+4$ L kilogrammes at the square centimeter.

(5) For parts which are subjected to an unvarying pressure as, *e. g.*, most of the parts of a building, the verticals in a parabolic support, the crossed diagonals of which have received an initial strain, equal to half their maximum strain:

For wrought iron, 1200 kilogrammes.

For cast steel, 2100 kilogrammes.

It will be seen from the foregoing that the strain for the square centimeter, regard being had to its relation to the working rigidity, must be taken at from 400 to 1200 kilogrammes for wrought iron, and from 600 to 2100 kilogrammes for cast steel.

The creditors of Secor & Son, proprietors of the Union Iron Works, this city, held a meeting last Wednesday. Over thirty creditors were present or represented by counsel. Twenty-seven of the creditors proved their claims, among the largest being the following: Warner & Swiss, $12,104·04; James H. Holden, $3891·85; A. D. & J. N. Brookman, $2915·91; Daniel F. Comey, $1997·51. Claims to the amount of $26,961·95 were admitted.

The New Steamers of the Clyde Lines.—The steamer South Carolina, of the Clyde's New York and Charleston line, arrived at Charleston a few days ago in the remarkable brief space of fifty-five hours from New York. This handsome and capacious ship has recently been rebuilt by Cramp & Sons, and transformed from a side wheel to a screw steamer, having a new propeller engine and a new boilers, greatly increasing her power and speed, as will be seen by the record of her first voyage since her transformation. An upper deck has been added, greatly increasing her capacity for freight and passengers, and also improving her external appearance. The ship has now space for 4000 bales of cotton, and registers 2099 tons. The South Carolina is a consort of the steamer Georgia, of the same line, which underwent the same alteration last year. Both ships have splendid passenger accommodations, which is an important feature in the trade between the two cities. The South Carolina adds one more powerful and capacious steamer to Thomas Clyde's large fleet of ocean steamers, showing that he is determined to keep ahead of the age in ocean steam navigation. The new steamer Defiance has also just taken her place in Clyde's Philadelphia and New York line, and is the pioneer of five screw steamers of a new type, designed to utilize and develop the trade between Philadelphia and New York through the Delaware & Raritan Canal, running inside during the season of canal navigation, and outside as a daily line during the winter. The Defiance has a massive hull, diagonally braced with iron, and built under underwriters' inspection, to insure at lowest rates when running outside along coast. She carries 400 tons of freight on a draft of seven feet, at a rate of speed of ten miles per hour. If these new steamers of the Defiance type answer the expectations of their projectors, they will revolutionize the steam traffic on canals, and the present style of canal steamer will become unprofitable and useless for the business.

Mines, Metals and Arts says that the Steam Forge and Novelty Works, 404 and 406 South Levee, St. Louis, has the contract for all the blacksmith work on the monster new steamer now on the ways at the docks in South St. Louis. The hull of this boat is something prodigious as to size. She is to have the cabin and a portion of the machinery of the Great Republic. But with eight feet better beam, and consequently with her immense steel boiler battery and carrying capacity, the question will be settled favorably that great size, speed, and a money-making boat are not incompatible associates. Contract covers the hog-chains, anchors, chains and wheel work, &c., &c.

ARCHITECTURAL IRON WORK.

BY WM. J. FRYER, JR.

PART IV.

(Continued.)

From the tables previously published is obtained the following:

TARIFF OF PRICES FOR LABOR AND MATERIALS.

	Cost.	Charge.		Cost.	Charge.
Blacksmith (forge) and 1 helper	$7·11	$8 50	Laborers	$1·50	$2·00
" " 2 helpers	10·00	12 00	Drill machine and 1 man	3·50	5·00
Finishers, machinists	3·50	5·00	Small lathe and 1 man	4·00	6·00
" extra helpers	2·55	3·50	Planer and 1 man	4 00	6·00
Pattern makers	4·40	6·00	Column turning machine, etc	6·00	10·00

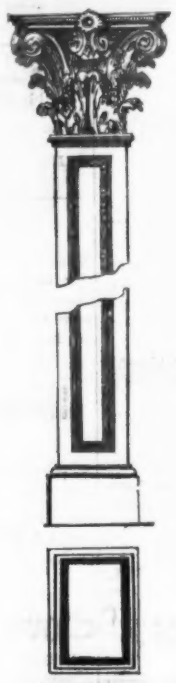
In making out bills for jobbing work always charge for the following:

Pattern materials,	Cast iron, by weight,	Cartage,	Blacksmiths.
Screws, etc.,	Wrought iron, by weight,	Pattern makers,	Machine use,
Bolts and nuts,	Labor,	Finishers,	Boxing.
Files,			

It is important that the cost of every article of common manufacture be made up in a book to be kept for that purpose. From time to time, as variations arise in prices of labor or materials, these costs must be revised.

As illustrations, the costs of a number of leading articles is given in detail below. From these the manner of definitely arriving at the cost of any article will be readily understood:

DEEP FLUTED ROUND COLUMN.



BOX COLUMN.

SHARP FLUTED ROUND COLUMN.

ROUND COLUMNS.

Cost of ordinary sharp fluted round columns, with carved heads and cap and base plates:

Diameter	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.
Length	8 ft.	9 ft.	10 ft.	11 ft.	13 ft.	12 ft.	13 ft.
Average cost of pattern	$0·20	$0·20	$0·25	$0·25	$0·30	$0·35	$0·40
Molding—3 small columns a day— 1 molder $3·00							
1 helper 1·50—	1·50	1·80	2·10	2·40	2·70	3·00	3·30
Facing	·25	·25	·30	·35	·40	·45	·50
Core—dry sand	·75	·85	·95	1·10	1·20	1·35	1·50
Chaplets, nails, &c.	·25	·25	·30	·35	·40	·45	·50
Cleaning	·25	·25	·30	·30	·35	·40	·45
Chipping	·35	·40	·45	·50	·60	·70	·80
Labor, taking out of foundry and loading	·25	·25	·30	·35	·40	·45	·55
Painting	·40	·50	·60	·70	·80	·50	1·00
Cartage	·40	·50	·60	·75	·85	1·00	1·25
Molding cap and base plates	·12	·15	·15	·15	·20	·20	·20
Turning ends in lathe	·60	·70	·80	·90	1·00	1·10	1·20
Losage—1 column in 8	·49	·57	·64	·72	·82	·92	1·06
Weight 25 lbs. to foot, including weight of cap and base plates							
Pig iron at $30 per ton [See Table Cost of Melted Iron] is per pound 3·27c	*6·54	*8·83	*11·77	*16·19	*21·97	*24·35	*31·39
Total cost	$12·35	$15·20	$19·51	$25·01	$31·99	$35·60	$44·30
Cost per foot	$1·55	$1·72	$1·95	$2·27	$2·67	$2·67	$3·40
	*300 lbs	*370 lbs	*360 lbs	*495 lbs	*672 lbs	*744 lbs	*960 lbs

† These items pay for breaking up in case of loss in casting.
Add a profit of 20 per cent. to get the selling price.

USUAL SIZE OF PLATES.

Diameter of Column.	Cap Plate.	Base Plate.	Diameter of Column.	Cap Plate.	Base Plate
4 inch	10x10x ⅝	8x 8x ⅝	8 inch	14x14x1⅛	12x12x1⅛
5 "	12x12x1	10x10x1	9 "	14x14x1⅛	12x12x1⅛
6 "	12x12x1⅛	10x10x1⅛	10 "	14x14x1⅛	12x12x1⅛
7 "	12x12x1⅛	10x10x1⅛			

The cores should be made in one piece in length, the castings made of an uniform thickness of metal, straight and reasonably perfect, and the ends turned off true in a lathe. The somewhat common practice of making columns with a greater thickness at the ends, where it is observable, than at any other part should not be followed. The risk that is thereby assumed is greater than the value of the metal saved warrants.

ROUND COLUMNS.

Cost of deep fluted round columns with full leaf Corinthian capitals and Attic bases:

Diameter	8 in.	10 in.	12 in.	14 in.	16 in.
Length	12 ft.	12 ft.	12 ft.	12 ft.	12 ft.
Average cost of pattern	$0·50	$0·70	$0·85	$1·00	$1·25
Molding { 1 day molder, $3·00 / 1 day helper, 1·50.	4·50	*5·38	*6·75	*7 88	*9 00
Facing	·42	·50	·60	·70	·85
Core	1·25	1·50	1·75	2·00	2·25
Chaplets, nails, &c.	·42	·50	·55	·60	·65
Cleaning	·45 ‡	·59	·70	·85	1·00
Chipping	·60 ‡	·85	1·20	1·50	1·75
Labor, taking out of foundry and loading	·40	·50	·75	1·20	1·50
Painting	·85	1·00	1·10	1·20	1·30
Cartage	·75	1·00	1·00	1·25	1·25
Molding cap and base plates	·20	·24	·24	·30	·30
Turning ends in lathe	·90	1·25	1·25	1·60	1·60
Losage, 1 column in 8	1·09	1·33	1·67	2·00	2·32
Weight (including weight of cap and base plates, at 3·27c ₩ lb.	†24·33	†33·35	†39·24	†46·09	†55·93
[Pig Iron taken at $30 per ton. See table of cost of melted iron.	$36·66	$48·60	$57·65	$68·17	$80·95
	†744 lb.	*1¼ dys †1020 lbs.	*1¼ d's. †1200 lbs	*1¼ d's. †1440 lbs.	*2 days. †1680 lbs.
COST OF CAPITAL.					
Outside diameter at neck	6¾ in.	8¼ in.	10 in.	12 in.	14 in.
Weight, 40 lbs., at 3·27c	$1·30	*$1·96	*$2·43	*3·43	*$4·58
Molding	1·75	2·00	2·50	2·60	3·00
Other expenses in foundry	·50	·65	·80	·95	1·20
Finishing, fitting and putting up	2·75	3·00	3·50	4·00	4 50
Screws, rivets, files, etc	·30	·35	·40	·45	·50
Painting	·50	·45	·50	·60	·75
Cartage	·15	·20	·25	·35	·50
	7·15	8·61	10·08	12·38	15·03
		*60 lbs.	*75 lbs.	*105 lbs.	*140 lbs.
COST OF SHELL BASE.					
Weight, 90 lbs., 3·27c	$0·98	*$1·14	*$1·30	*$1·64	*$2·13
Molding	·65	·75	·90	1·05	1·20
Other expenses in foundry	·30	·35	·40	·50	·60
Finishing, fitting and putting up	·45	·50	·60	·70	·80
Screws, files, etc	·15	·18	·22	·26	·30
Painting	·12	·15	·20	·30	·40
Cartage	·12	·15	·18	·20	·22
	2·77	3·22	$3·80	4·65	5·63
Total cost	*35 lbs.	*40 lbs.	$71·53	*50 lbs.	*65 lbs.
	$46·58	$60·43		$85·20	$101·61

‡ These items pay for breaking up in case of loss in casting.
Add a profit of 20 per cent. to get the selling price.
NOTE.—It will be observed that when the length of the column is increased or diminished, the cost varies only as to the quantity of iron in the column. All the other items remain the same.

BOX COLUMNS.

Cost of panelled box columns, including the cost of workmanship and materials of capitals and fastening the same on at building.

Size	6x12 and 8x12	8x14 and 8x16	10x12 and 12x12	12x18 and 15x20	16x18 and 14x30
Average cost of patterns	$1·00	$1·00	$1·23	$1·25	$1·50
Moulding	4·50	5·00	5·50	6·00	6·75
Facing	·50	·60	·70	·80	·90
Core	1·00	1·10	1·20	1·30	1·40
Chaplets, nails, etc	·25	·25	·30	·30	·35
Cleaning	·40 *	·50	·60	·75	1·00
Chipping	1·00 *	1·00	1·15	1·25	1·50
Labor, getting in flasks, taking out casting, etc	1·00	1·15	1·30	1·50	1·75
Painting	·75	·80	·85	·90	1·00
Cartage	1·00	1·00	1·25	1·25	1·50
Molding cap and base plates	·20	·22	·24	·26	·28
Turning ends in lathe	1·00	1·00	1·20	1·20	1·40
Losage, 1 column in 8	1·23	1·35	1·78	1·68	1·93
	$13·63	$14·97	$17·07	$18·44	$21·36
Weight	2·19†	2·84†	3·27†	3·92†	4·64†
Molding	1·80	2·10	2·40	2·70	3·00
Other expenses in foundry	·60	·80	1·00	1·20	1·40
Finishing, fitting and putting up	4·00	4·00	4·25	4·25	4·50
Screws, files, etc	·25	·25	·25	·30	·35
Painting	·25	·25	·30	·30	·35
Cartage	·15	·15	·20	·20	·25
The average for windows and doors is two-thirds of this	$9·24	$10·39	$11·67	$12·87	$14·49
	$6·16	$6·93	$7·78	$8·58	$9·66
Cost, without iron	$19·99	$21·90	$24·85	$27·02	$30·92
	†67 lbs.	†87 lbs.	†100 lbs.	†120 lbs.	†143 lbs.

* These items pay for breaking up in case of loss in casting.

TABLE.

[Arranged from the foregoing details.]

Cost of workmanship on box columns, including leaf capitals, say:

6x12	$14·00	10x12	$17·09	14x12	$19·00	18x12	$20·00
6x14	14·50	10x14	17·50	14x14	19·50	18x14	20·50
6x16	15·00	10x16	18·00	14x16	20·00	18x16	21·00
6x18	15·50	10x18	18·50	14x18	20·50	18x18	22·00
6x20	16·00	10x20	19·00	14x20	21·00	18x20	23·00
8x12	14·00	12x12	17·09	16x12	19·00	20x12	20·00
8x14	14·50	12x14	17·50	16x14	19·50	20x14	21·00
8x16	15·00	12x16	18·00	16x16	20·00	20x16	22·00
8x18	15·50	12x18	18·50	16x18	21·00	20x18	23·00
8x20	16·00	12x20	19·00	16x20	22·00	20x20	24·00

TABLE.

Weights of ordinary box columns, panelled, made as light as can be safely run, and with open backs.

[Plates included].

Size.	Weight in lbs.	Size.	Weight in lbs.	Size.	Weight in lbs.	Size.	Weight in lb.	Size.	Weight in lbs.	Size.	Weight in lbs.	Size.	Weight in lbs.	Size.	Weight in
6x10	69	8x10	78	10x10	87	12x10	96	14x10	105	16x10	113	18x10	126	20x10	138
6x12	78	8x12	87	10x12	96	12x12	104	14x12	113	16x12	123	18x12	133	20x12	145
6x14	89	8x14	96	10x14	105	12x14	113	14x14	123	16x14	133	18x14	143	20x14	153
6x16	99	8x16	107	10x16	113	12x16	123	14x16	134	16x16	144	18x16	154	20x16	165
6x18	109	8x18	118	10x18	126	12x18	136	14x18	145	16x18	156	18x18	166	20x18	178
6x20	120	8x20	128	10x20	138	12x20	149	14x20	160	16x20	170	18x20	180	20x20	190

EXAMPLE.

What is the cost of a box column 14 in. face, 16 in. deep and 12 ft. long?

Weight, 134 lbs. to a foot [see above table]—1608 lbs. @ 3·27c	$52·50
Workmanship, including the capital	20·08
Cost	$72·58
Add 20 per cent. profit	14·52
Sell	$87·10

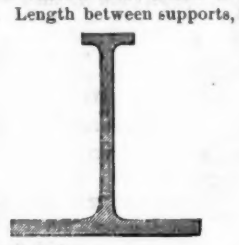
Is $7·27 per lineal foot, or 5·42c. per pound.

NOTE.—If columns are deep panelled or heavy moldings in panels, the weight will be considerably more.

If shutter grooves are required add for additional weight and labor. Setting of columns always charged in addition.

CAST IRON BEAM.

Suitable to sustain three stories of 12 inch brick wall. Length between supports, 20 feet.

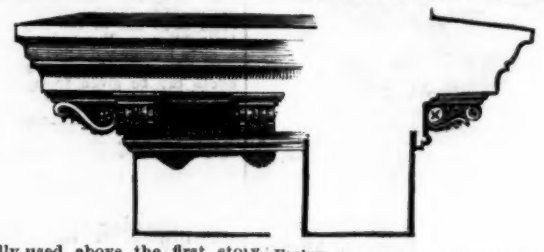


Top flange, 4"x1¼".
Center flange, 21x1⅛—14 inches at ends.
Bottom flange, 12"x2¼".

Average cost of pattern, flasks, etc		$2·00
Molding—2 molders 1 day, $3·00	$6·00	
1 helper 1 day	1·50	—7·50
Facing		1·00
Chaplets, etc		·40
Cleaning		·50
Chipping		1·50
Labor, bringing in flasks, getting out castings, etc		1·00
Sundries		1·00
Painting		1·25
Cartage		3·00
Losage—1 beam in 15		2·24
Weight, 3485 lbs. @ 3·27c		113·96
Cost		$135·25

Add 20 per cent. profit for selling price.

LINTEL AND CORNICE COURSE,



such as generally used above the first story columns.

Lintel—weight, say 100 lbs. to ft. at 3·27c.	$3·27	
Molding, etc	2·00	$5·27
Cornice—Weight 45 lbs. to ft. at 3·27c	$1·47	
Molding, etc	·60	
Fitting up at shop	2·00	
Putting up at building	·50	
Screws, bolts, files, etc.	·30	4·87
Painting		·40
Cartage		·20
Sundries		·25
Cost per foot		$16·99

Add 20 per cent. profit for selling price.

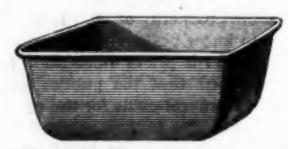
WINDOW LINTEL.

Average cost of pattern	$0·15
Molding	1·20
Facing	·08
Cleaning	·12
Chipping	·15
Labor	·05
Painting	·25
Cartage	·20
Sundries	·10
Losage, 1 lintel in 10	·15
Weight, 90 lbs. at 3·27c	2·94
Cost	$5·39

Add 25 per cent. profit for selling price.

OAT MANGER.

Size inside, 22¼ in. by 14¾ in. by 9¼ in. deep.



Weight, 60 lbs. at 3·27c	$1·96
Molding	·10
Facing, molding sand, handling, etc	·60
Cleaning, chipping, files, etc	·12
Cartage	·08
Losage	·10
Cost	$2·96

Add 33⅓ per cent. profit for selling price.

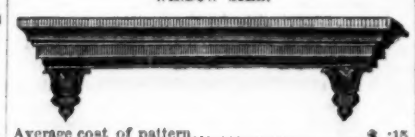
ARCH GIRDER.

Suitable to sustain four stories of 12 inch brick wall. Length, 25 feet.

Average cost of pattern, flasks, &c		$2·50
Molding.—2 molders 1 day each	$3·00—$6·00	
2 helpers 1 day each	1·50— 3·00	9·00
Cores		1·00
Facing		1·00
Chaplets, &c		·40
Cleaning		·50
Chipping		2·00
Labor, bringing in flasks, taking out casting, &c		1·00
Sundries		1·00
Painting		1·25
Cartage		3·00
Losage, 1 girder in 10		1·84
Weight, 2800 lbs. at 3·27c		91·56
Wrought iron tension rod, 2¾ in. diam., including forging, fitting, etc., 520 lbs. at 7c.		36 40
Cost		$152·45

Add 20 per cent. profit for selling price.

WINDOW SILL.

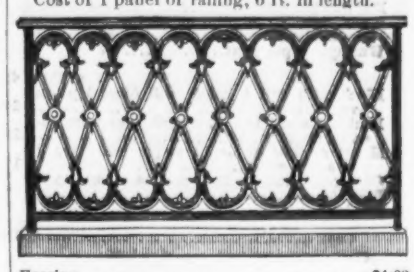


Average cost of pattern	$ ·15
Molding	·80
Facing	·06
Cleaning	·12
Chipping	·15
Labor	·05
Painting	·25
Cartage	·15
Sundries	·10
Losage, 1 sill in 10	·12
Weight 60 lbs. @ 3·27c	1·96
Cost	$3·96

Add 25 per cent. profit for selling price.

RAILING.

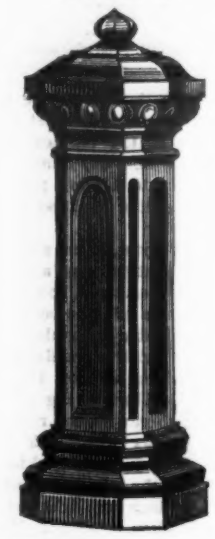
Cost of 1 panel of railing, 6 ft. in length.



Forging	$1·00
Finishing in shop	1·50
Lead—2½ lbs. @ 8c	·20
Files, chisels, etc	·20
Painting	·25
Labor, cartage, etc	·25
Putting up at building	1·50
Sundries	·50
Weight: Wrought iron.— Bottom rail, 1¼x⅛, 6 ft. Top rail, 1¼x⅛, 6 ft. Brace, ⅛x¾, 3 ft. Post, ⅛x⅛, 3 ft. } 35 lbs. at 3·22c	1·03
$65 per ton—[see table].	
Cast iron.—Hand rail 20 lbs.	
Railing castings, 60 lbs.	
80 lbs. at 3·27c.	3·61
Pig iron—$30 per ton, [see table].	
Molding and other costs in foundry 1·60	4·21
Cost of 6 ft	$10·64

Add 25 per cent. profit for selling price.

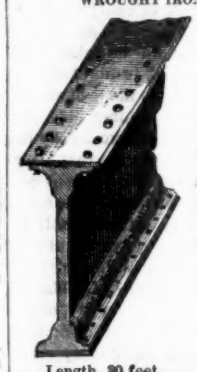
NEWAL POST.



Weight, 115 lbs. at 3·27c	$3·76
Molding, and other costs in foundry, etc	2·30
Finishing	3·50
Screws, files, etc	·60
Painting	·40
Labor	·20
Cartage	·30
Cost	$11·06

Add 25 per cent. profit for selling price.

WROUGHT IRON PLATE GIRDER.



Web, 20"x5-16".
Top plate, 10"x⅛".
Bottom plate, 8"x⅛".
Top angles, 4"x4"x7-16".
Bottom angles 3½"x3½"x⅜"

Length, 30 feet.

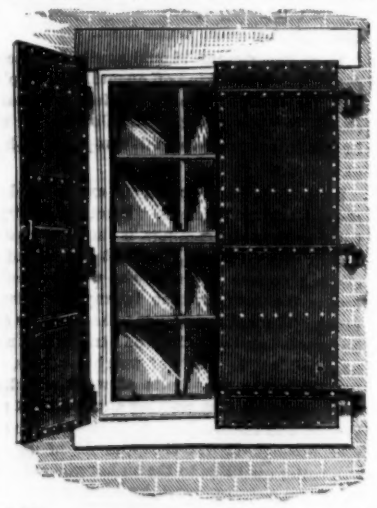
Weight, say, 2,600, lbs.; av. 3½c	$91·00
Making: 4 hours forge and 3 helpers, $1·30	$5·20
" 10 hours forge and 3 helpers, 71c	7·10
" 20 hours finisher and 4 helpers, $1·49	28·00
" 5 hours finisher and 3 helpers, punching, $1·15	5·75
" 5 hours finisher and 1 helper, 65c	3·25
	$49·30
Use of punch, shears, &c	10·00
Rivets, 120 at 7c	8·40
Painting	2·00
Cartage and handling	4·00
Cost	$164·70

Add 25 per cent. profit for selling price.

IRON SHUTTERS.

Made in 2 folds, and hung to eyes built in wall.

Size, 4'x6'.
Frames, 1½"x½", covered with No. 16 sheet iron.

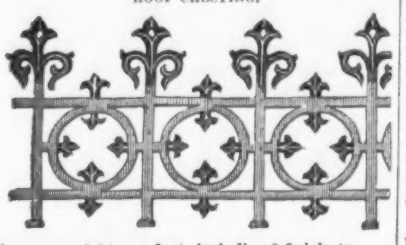


Weight:	Lbs.
4 uprights, 6' each—24 ft. of 1½x½	60
4 crosses, 4' " " 16 ft. of 1½x½	40
2 Hinges, 4' " " 8 ft. of 1½x½	20
1 striking bar, 5' of 2x½	16
Latches, rings, &c	3
Rivets	5
Wastage 10 per cent.	15
	159

Bar iron $65 per ton	at 3·22c.	$5·12
Sheet iron, No. 16, 4' 3"x6' 2", including laps	69	
Wastage, 10 per cent.	7	
	76 at 5½c.	4·18
Blacksmith and 1 helper will forge 3 pair a day, $7·11, is		2·37
Finisher and 1 helper, with shop expenses on same, making, say		3·00
Hanging: finisher and 1 helper will hang 6 pair a day, say		1·00
Cartage (8 pair to a load) and handling, say		·50
Painting		·60
Sundries		·50
Cost		$17·27

Cost per square foot, superficial, 79c.
Add 25 per cent. profit for selling price.

ROOF CRESTING.



Average weight per foot, including 2 finials to each 25 ft. 10 lbs. at 3·27c.	$ ·33
Molding and other costs in foundry	·30
Cleaning, chipping, etc	·05
Fitting up in shop	·10
Screws, files, etc	·03
Painting, cartage, sundries, etc	·08
Putting up at building	·15
Cost, per foot	$1·04

Add 33⅓ per cent. profit for selling price.

These illustrations could be carried to the full extent of showing the cost of every article that pertains to the business. Enough has been given to enable any foundryman to adapt these principles to his own particular class of work, based on the business expenses under which he rests.

The cost of most, if not all, of the articles given in illustration may appear excessive. It must be remembered, however, that there are but few of a kind to be made at a time, and at considerable intervals of time apart. To get out the patterns and flasks and shifting of various articles, all takes time which must be considered. The molding time and expenses connected therewith, and risk of losing the casting, is greater when making up a small number than they are in making up a large number. So in the delivery by cartage, a small number of castings and light weight have frequently to be taken for a load. No one need be told that the cost is much more, proportionately, in making two or three castings of a kind than it is in making two or three hundred. It would be a waste of time to recite why the cost is proportionately less on a greater than on a lesser number; it is self-evident to every foundryman.

This printed information and guide is entirely in the interest of the producer. It is to enable him to fully cover the cost of every article, and not to make a profit on one article and a loss on another. Everything should be taken out of the realm of guess-work and brought down to hard facts. If errors are to be made at all, they need to be made on the winning side. The costs had better be calculated excessively than not enough. It is quite probable that after a foundryman arranges a complete line of costs of the various articles he manufactures, on the system here laid out, that the result will be a curtailment of his business by reason of being unable to compete in prices with his neighbors. Such a man need have no regrets. Let him confine himself to such articles as do pay, or raise the standard of his work so as to command a superior price in market. How many men at the end of a year, after doing a large business, are unable to account to themselves for not making money? They cannot discover where any material savings could have been made or greater economy practiced, and yet there is nothing to show for a whole year's hard labor and anxiety. The fault lay in the fact that a considerable portion of their manufactures were made at a loss. The thousand and one small items had not been considered, and a system of self-deception had been continuously practiced, bringing, in the end, disappointment and discouragement. These small items make up a gross sum which is truly astonishing. A smaller business may be done, but it will be a profitable one, and will steer clear of bankruptcy. The making up of detailed tables of costs are generally considered disagreeable duties, and put off as long as possible. They are necessary to success, and if a foundryman studies his best interest, he will not only make them complete, but often revise them.

In no department should anything be left to guess work. In taking off quantities from plans, &c., for the purpose of making proposals, it should be done in such a detailed manner as to be readily referred to and compared with the executed work.

In the foundry a careful and experienced man should act as foreman. Practical ability in turning out good castings is the one great requisite in such a man, and not one full of scientific theories. More money will be made or lost in the foundry than in any other department. The making of unnecessary flasks must be guarded against—those on hand used as much as possible; the stock of weights, arbors, etc., kept as low as the limits of work will allow; wages seen to that nothing above market rates is paid, and the work properly sorted—the common castings to the cheap grade of molders, the better qualities to the higher grade of molders. The melting must be looked after to see that the mixtures of iron are properly made, and the cupola charged without waste of material. Economy everywhere must be enforced.

In the pattern shop a foreman of experience, good judgment and exceedingly careful and correct must be selected. Molding is rendered difficult or simple as the patterns are made. The patterns for building work are rarely intricate, and the shrinkage of iron and the contraction of castings in cooling are governed by very simple laws.

Between the draughtsman in making working drawings, and the foreman of pattern makers, and the foreman of molders perfect accord should reign. It is not always possible to design the casting with equal masses of metal throughout, and then the responsibility will devolve upon the founder, who must, by accelerating cooling of parts by early uncovering, or by retarded cooling of other parts, produce a simultaneous rate of cooling throughout the casting. Great care must be exercised in making patterns to secure a proper distribution of metal. This arises from the fact that in cooling the thinnest parts of the casting becomes quite cool, while the heavier parts are yet red hot. The part which has cooled first having contracted and set, while the other portion is yet soft, the result is that the casting pulls apart in the mold, or is left with a strain and tension which, upon being subjected to a sudden jar or even to the influences of the weather in expanding or contracting the iron, will produce after breakage.

In the finishing department the foreman must have a thorough practical knowledge of his branch of work, and ability to control the men under him and get out of them all the work possible. And he must not only have the drive and snap in him, but the workmanship of his men must be good, as well as expeditiously done.

Over all, the care and watchfulness of the manager must be omnipresent. Waste must be prevented, each department made to work systematically and harmoniously with every other, surplus men cut off, and the pay rolls kept within the closest bounds. Supplies must be bought at the lowest ruling rates, and every item in liberal quantities. The shop must be kept well supplied with work. If good results are to be obtained from journeymen, they must have confidence that there is a full quota of work ahead. Otherwise they will nurse their work in order not to work themselves out of a job. The work must be regular and not spasmodic. Men work with a will and do their best in busy times, and the reverse of this in dull times. The beginning and the end of the business rests on the manager—on his industry, patience, skill and experience.

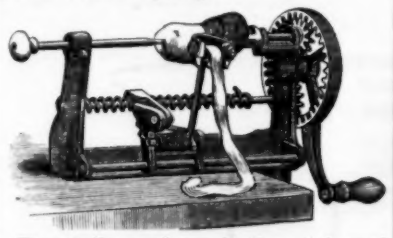
The foundry business is peculiar in one respect. The manager has continually to overcome a tendency to name lower rates per pound in taking orders than the facts of the real cost of production warrants. The business is carried on for the purpose of making money, and that aim needs constantly to be enforced by thorough and systematic arrangement of and reference to tables of costs.

The field is broad enough without calling forth an unhealthy competition. Frequent and friendly intercourse between those engaged in the same pursuits, and comparisons of opinions and experiences contribute to the common good. What effects the prosperity of one affects more or less the prosperity of all. It is certainly desirable to know positively what products cost, and to establish prices which allow fair profits.

It is hoped that the publication of these tables and general guide for the conduct of the business will give to those engaged in the manufacture of iron work for buildings a broader comprehension of their business, and also induce them to make careful and complete statistics of everything relating thereto, and make public that knowledge. Great mutual benefits will result. The magnificent proportions which the manufacture of this class of iron work is to assume in the future can scarcely be realized.

Potato Parer.

The accompanying illustration represents D. H. Whittemore's Potato Parer, which the manufacturer claims will pare perfectly, long, crooked or unevenly shaped potatoes at a great saving of time, and an immense saving of the potato over hand-paring.



The spindle or rod seen in the cut is used only on extra long potatoes. It pares turnips, and can also be used as an Apple Parer. They are offered to the trade by J. Clark Wilson & Co., who are sole agents for these goods, at $15 per dozen, net.

The Woodruff Iron Works.

We take the following from the Hartford *Times* of the the 4th instant:

The creditors of the "Woodruff Iron Works" met in accordance with their adjournment, at the United States Hotel, at 2 p. m., yesterday. The committee appointed the previous meeting to enquire as to the financial condition of the company, and report what course in their judgment is advisable for the creditors to pursue in regard to it, submitted a verbal report. They had examined the statement made by the previous committee embodying the appraisal of the property, bills payable and a schedule of indebtedness; and had also conferred with Mr. Woodruff, his book-keeper and others who were conversant with the affairs of the company. The capital was at first furnished by the late Abijah Woodruff. It was insufficient, and his estate is complicated in the affairs of the company. Without much capital or credit, the firm had worked up to a large business (over $700,000), in three years. But it had done business to a disadvantage. It had borrowed money at heavy rates, evidently, for its interest account was enormous. The property of Abijah Woodruff and of the company had been mortgaged or put up as collateral, till they could go no farther. The Chicago fire destroyed a large interest of Mr. Samuel Woodruff, in the Putnam Fire Insurance stock, which had been previously pledged as collateral, and which was now worth nothing, leaving a heavy indebetedness upon that gentleman individually, who had no means to meet it. Over the mortgages and liens, judgments, and assigned contracts of the company, there appeared to be something remaining according to the appraisal; but this would probably be absorbed, should the concern attempt to go on. There was not enough to pay much to unsecured creditors—nothing, should the machinery, tools and patterns be subject to a forced sale, with an understanding that the works were to be closed up entirely. The committee thought it was best for the creditors to put the company into bankruptcy in the United States Court. By this course the unsecured creditors would lose nothing, for by any other they could get nothing. Should they secure nothing out of the assests by this course, they might get an incidental advantage in clearing Mr. Woodruff of his debts, and opening the way for him to earn something in the future. Freed from debt he might secure aid to purchase the machinery at the appraisal, or act as the agent of a company that would purchase it. He has a high reputation for doing good work, and can get work enough to do if he is permitted to do it—work that would not otherwise come to this city. If relieved of the indebtedness that holds him down, he would probably be able to arrange for a business that would give considerable employment to workmen here. Should he go into bankruptcy voluntarily, he could not get a discharge without paying 50 cents on the dollar, without the consent of a large part of his creditors. If put into bankruptcy by his creditors they will get the benefit of the property that may be found above the mortgaged and assigned assets, if any such property appears. The committee who made this report were Messrs. F. A. Pratt, William A. Healy, C. C. Kimball and A. E. Burr, of Hartford, and Mr. Emmons, of New York. A vote was passed, with hardly a dissenting voice, that it was advisable for the creditors to place the Woodruff Iron Works into bankruptcy in the United States court. There were thirty-four of the creditors present.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, Dec. 8, 1875.

The past week has been one of suspense in Wall street, as is usually the case just previous to the meeting of Congress and the publication of the Executive message, with its accompanying documents. There was nothing in the State papers this year to create any excitement, and now that the suspense is over, everything will go on pretty much as before. The report of the Secretary of the Treasury is summarized by the President as follows: "The report of the Secretary of the Treasury shows the receipts from customs for the fiscal year ending June 30, 1874, to have been $163,103,833·69; and for the fiscal year ending June 30, 1875, to have been $157,167,722·35—a decrease for the last fiscal year of $5,936,111·34. Receipts from internal revenue for the year ending 30th of June, 1874, were $102,409,784·90, and for the year ending 30th of June, 1875, were $110,007,493 58; increase, $7,597,708·68."

The President commits himself squarely to an approval of all legislation looking to the resumption of specie payments, and what he says upon this subject will, we think, command the approval of a large proportion of business men and manufacturers. The sentiment of the country on this question is by no means unanimous, but we think that the weight of public opinion is on the side of a return to a specie basis by the shortest and safest route.

During the early part of the week the local money market was active, and call loans advanced to 6 @ 7 per cent., but it has since relapsed into comparative ease with 4 @ 5 per cent as the ruling rates on call. Prime business paper is fairly quotable at 6 @ 8 per cent.

The gold market has been quiet, with cash coin easy for borrowers. The decline in the premium is due to the fact that the President's message removes all apprehension of war with Spain on the subjects supposed to be matters of international dispute. The daily range of the premium is shown in the following table:

	Highest.	Lowest.
Thursday	115¼	114⅞
Friday	114⅞	114⅝
Saturday	114⅝	114⅝
Monday	114⅝	114¼
Tuesday	114⅝	114¼
Wednesday	114⅝	114

Government bonds have declined in sympathy with gold, but are strong in the London market. Railroad mortgages are in very light demand, but prices are well maintained. We give below the closing quotations of governments.

In the stock market but little business has been transacted, and prices have fluctuated considerably. The principal activity has been in Pacific Mail, Erie, Lake Shore, Western Union, Northwestern, Union Pacific and St. Paul. We give below the prices bid and asked for active shares at the close of business to day.

The bank statement shows a smaller loss in the legal tender average and in the reserve than was expected. The total reserve is down $2,463,700, and the surplus reserve $1,177,425, the total of the latter being now $8,171,875. The following is a comparison of the averages for the past two weeks:

	Nov. 27.	Dec. 4.	Differences.
Loans	$271,910,200	$271,006,500	Dec.. $903,700
Specie	16,262,500	15,157,500	Dec.. 1,105,000
Legal tend's	47,038,900	45,680,200	Dec.. 1,358,700
Deposits	215,808,400	210,663,300	Dec.. 5,145,100
Circulation	18,512,100	18,750,600	Inc... 238,500

The following tables show the foreign trade movements for the week:

IMPORTS.

	1873.	1874.	1875.
Total for week	$5,093,110	$5,517,736	$8,447,126
Prev. reported	359,366,002	359,628,792	296,997,106
Since Jan. 1	$364,459,112	$365,146,528	$305,444,232

Among the imports of general merchandise were articles valued as follows:

	Quant.	Value.
Brass goods	5	$1,466
Bronzes	88	15,048
Chains and anchors	59	3,326
Copper	151	162
Cutlery		30,337
Gas fixtures	1	245
Guns	35	7,206
Hardware	9	1,366
Iron, pig, tons	940	17,824
Iron, sheet, tons	18	1,890
Iron, cotton ties	445	1,295
Iron, other, tons	161	10,581
Iron, ore, tons	380	590
Lead, pigs	1,517	10,930
Metal goods	117	16,148
Nails	8	2,389
Needles	14	7,624
Old metal		190
Platina	1	2,620
Per. caps	17	3,246
Saddlery	9	1,150
Steel	1,098	29,078
Silverware	5	479
Tin, boxes	15,310	96,246
Tin, 8898 slabs	835,949	149,335
Wire	892	9,237
Zinc	40,700	2,636

The figures of merchandise exports were not at hand at the time of going to press.

EXPORTS OF SPECIE.

Total for the week	$808,280
Previously reported	11,451,234
Total since January 1, 1875	$12,259,464
Same time in 1874	5,998,601
Same time in 1873	17,890,422
Same time in 1872	5,485,287

Government bonds at the close were quoted at the following quotations:

	Bid.	Asked.
*U. S. Currency 6's	122	122½
*U. S. 6s 1881, reg	119⅝	119⅞
U. S. 6s, 1881, coup	123¾	124
U. S. 5-20 1864, reg (Called)	114¾	115
U. S. 5-20 1864, coup (Called)	114¾	115
U. S. 5-20 1865 reg	115⅝	116
U. S. 5-20 1865, coup	115⅝	116
U. S. 5-20 1865, new	116¾	117
U. S. 5-20 1867, reg	120¾	120⅝
U. S. 5-20 1867 coup	119¾	119⅝
U. S. 5-20 1867, coup	122⅝	122¾
U. S. 5-20 1868, reg	118¾	119¼
U. S. 5-20 1868, coup	122⅝	122⅞
U. S. 10-40 reg	117⅝	117⅞
U. S. 10-40 coup	117⅝	118
U. S. 5s, 1881, reg	116⅞	117⅛
U. S. 5s, 1881, coup	117	117⅛

The following are the closing quotations in the stock market:

	Bid.	Asked.
Atlantic & Pacific Preferred	3½	4
Atlantic and Pacific Telegraph	19⅜	20⅛
Chicago & Northwestern	39⅜	39¾
" Pref	56⅜	56¾
Chicago, Rock Island and Pacific	104⅜	104⅞
Chic., Bur. & Quincy	114⅜	115⅛
Col., Chic. & Ind. Cent	4⅜	4¾
Clev., Col., Cin. & Ind's	57⅛	58
Cleveland and Pittsburgh	90	90¾
Chicago & Alton	97	97⅜
" Pref	105	106
Consolidation Coal	46	47
Canton	38	40
Del. Lack. and Western	120	120½
Delaware & Hudson Canal	122⅞	123
Adams Express	102¾	103
American Express	60⅜	60½
United States Express	57	58
Wells, Fargo & Co. Express	82⅞	83¼
Erie	16⅛	16⅜
Harlem	132¾	133½
Hannibal & St. Joseph	21⅛	21⅜
" Pref	25¾	27
Illinois Central	95¾	96
Kansas & Texas	8	8⅛
Lake Shore	61⅛	61⅜
Michigan Central	61⅜	61¾
Morris & Essex	104	105
Milwaukee & St. Paul	36⅛	36⅜
" Pref	66⅛	66⅝
Mariposa	8½	9
" Pref	9	10
New York Central	105¼	105
New Jersey Central	105	105½
Ohio & Mississippi	17¾	17⅞
Pacific Mail	41	41¼
Panama	125	126½
Pittsburgh & Fort Wayne	99	99¼
Pacific of Missouri	12½	13
Quicksilver	17½	18
" Pref	24½	25½
St. Louis and Iron Mountain	15⅞	16⅛
St. Louis, Kan. City North'n Pref	24	26
Tol., Wabash & Western	4⅞	5⅛
Union Pacific	77	78
Western Union Telegraph (ex'd)	76⅞	77

GENERAL HARDWARE.

The condition of the market continues much the same as at our last report. Some activity in holiday goods is reported, but generally speaking this trade falls short of the anticipation of dealers. Leading makers of Silver Plated Ware are fully employed, and importers of fine Cutlery are doing a fair business.

Hermann Boker & Co., proprietors of the Trenton Vise and Tool Works, are manufacturing a first-class article of Pruning Shears, for which they solicit orders for spring delivery. They make two styles—the Stationary and Swivel Blades, and they claim for these goods that they are the strongest, and in every way the best Pruning Shears on the market. Samples can be seen at their warehouse, Nos. 101 and 103 Duane street.

A few weeks ago we invited the attention of the Hardware trade to the new and elegantly finished Hand Saw which Henry Disston & Sons had just placed on the market, and which they styled "Centennial No. 7," and we are not surprised to learn that already so many orders have been received for it that the manufacturers are obliged to increase their facilities for its production to keep pace with the demand. To avoid any mistake or confusion in ordering, H. Disston & Sons have (very wisely, we think) changed the number of the "Centennial No. 7" to "Centennial No. 76," thereby preventing any possibility of mistake in ordering, which would be likely to arise on account of the number corresponding to their Saw of world-wide reputation, "Disston's No. 7." On page 29 a full description and illustration of the "Centennial No. 76" will be seen, to which we ask the attention of our readers.

The demand for Nails is not as active this week as at our last report. We quote 10d. at $3 per keg, net. Orders for lots of 200 kegs and over could be placed at a shade better than the above mentioned price.

The Lock manufacturers held their annual meeting at New Haven on Tuesday. Some changes were made in list prices, but otherwise the prices for the past season were adopted for the coming six months, viz.: discount 40 and 5 per cent. The meeting was very large and harmonious, and a firm determination was expressed on all sides to strictly and honorably adhere to the terms adopted. Their next session will be held in February, 1876. The changes in list prices, which were all advances on existing figures, are as follows: On all 3½, 4 and 4½ in. Mortise Locks, Iron Front, add 50 cents per dozen; on all ditto, Brass Front, add $1·50 per dozen; all plain Spindle Front Door Locks, with Night Work, add $4 per dozen; all plain Spindle Vestibule Latches, add $3 per dozen.

The following are the revised prices of Mortise Locks, manufactured by The Russell & Erwin Manufacturing Co.

No.	per doz.	No.	Per doz	No.	Per doz.
0	$6·00	110	6·00	0314	15·50
0½	7·50	115	47·00	315	18·50
00½	8·00	180	48·00	316	21·50
0¾	10·00	180½	33·00	0321	10·50
00¾	10·00	181	52·00	0322	12·50
0½	7·00	181½	37·00	0323	14·00
0½	8·50	182	50·00	0324	16·00
00½	9·00	182½	35·00	310	6·00
0¾	11·00	183	54·00	341	10·00
00¾	11·00	183½	39·00	343	12·00
1	12·00	184	52·00	344	14·00
01	12·00	184½	37·00	350	7·00
1½	14·00	185	56·00	351	11·00
01½	14·00	185½	41·00	353	13·00
01¾	13·00	186	60·00	354	15·00
02	15·00	300	6·50	355	18·00
12	14·00	0300	6·50	360	6·00
13	16·00	301	8·00	361	7·50
013	16·00	0301	8·50	0361	8·00
013, 2keys	18·50	302	10·50	0362	10·00
013¼	22·0	0302	10·50	0363	12·00
13¼	19·00	303	12·50	0364	14·00
013¼	19·00	0303	12·50	710	14·00
013¼, 2k	21·50	304	14·50	711	12·00
13¼	22·00	0314	14·50	712	14·50
013¾	22·00	3·0	7·50	712, 2 keys	17·00
013¾, 2 k	24·50	0310	7·50	713	16·50
019	25·50	311	9·00	713, 2 keys	19·00
23	10·00	0311	9·50	713¼	19·50
100	56·00	313	11·50	713¼, 2 ks	21·00
100½	52·00	0312	11·50	713¼	22·50
104	60·00	313	13·50	713¾, 2 ks	25·00
105	37·00	0313	13·50	720	15·00
105¼	37·00	314	15·50		

The revised list of the Jacobus & Nimick Mfg. Co.'s Locks and Latches will be found below. Graham & Haines, No. 88 Chambers street, are their agents in this city.

REVISED PRICES OF LOCKS AND LATCHES MANUFACTURED BY THE JACOBUS & NIMICK MFG. CO.

No.	Per doz.	No.	Per doz.	No.	Per doz.
50	6·00	103½	11·50	1190	60·00
50¼	7·50	104¼	13·50	1001	56·00
101	6·50	104¾	15·00	1003	60·00
101¾	8·00	105¼	10·50	131	68·00
103	7·50	106¾	12·50	0131	72·00
103¼	9·00	107¼	14·50	1310	76·00
50¼	10·00	108¾	16·50	90	37·00
52¾	12·00	109¾	19·50	090	45·00
52¾	14·00	0109¾	22·50	900	45·00
101¾	10·50	114¾	27·00	97	47·00
102¾	12·50	0114¾	3 ·50	097	51·00
102¾	14·50	119	52·00	970	55·00
1020	17·50	0119	60·00		

We have received the following circulars:

NORTH EASTON, Mass., Dec. 1, 1875.

GENTLEMEN: On and after this date we will make a reduction of 50 cents per dozen, list, on the Shovels numbered as follows in our price list of July 1, 1875: Nos. 51, 52, 53, 54, 55, 73, 74, 75, 139, 140, 141, 158, 159, 160. Yours respectfully,

OLIVER AMES & SONS.

PHILADELPHIA, Dec. 4, 1875.

GENTLEMEN: On and after this date our discount off Shovels, Spades and Scoops will be 35 per cent., cash 30 days.

Soliciting your further orders I remain, yours, truly,

GEORGE GRIFFITHS,
No. 515 Locust street.

DEEP RIVER, Conn., Dec. 1, 1875.

DEAR SIRS: A report has been printed in a certain newspaper, and copied into others, to the effect that I have disposed of my factories and business.

This statement is without a shadow of foundation in fact.

No person but myself has any interest in my factories, or the business connected with them, either directly or indirectly.

My customers may rest assured that I have no intention of selling to any one, either in whole or in part. Yours, truly,

RUSSELL JENNINGS.

Office of UNION STEEL SCREW CO., SOLE MANUFACTURERS OF BESSEMER STEEL WOOD SCREWS, CLEVELAND, O., Dec. 1, 1875.

GENTLEMEN: Assuring you of our continued disposition to furnish Steel Screws at prices and terms as favorable as may be made by manufacturers of Iron Screws, we quote the following discounts from list of September 1st, 1875:

Flat Head Steel	Discount 40 %
Flat Head Brass	" 40 %
Round Head Steel	" 30 %
Round Head Brass	" 30 %

TERMS: Cash within 30 days from date of invoice.

We guarantee the quality of our Screws to be superior to that of any Iron Screw manufactured, and respectfully solicit the opportunity of executing your orders.

UNION STEEL SCREW CO.

The Hart, Bliven & Mead Mfg. Co. carry a full stock of their Screws, and are authorized to meet the prices of other manufacturers in this and all the markets.

PHILADELPHIA, Dec. 2, 1875.

GENTLEMEN: Our Price for Steel Wood Screws has been reduced to 40 per cent. off present list (Iron and Steel Screw lists being the same), and we guarantee a quality that no Iron Screw can rival.

NEWLIN & YARDLEY,
Sole Agents Union Steel Screw Co.

THE CORTLAND HORSE NAIL MFG. CO., NEW YORK, Dec. 1, 1875.

We would respectfully announce to the Hardware trade, that this company has bought of the "Middletown Horse Nail Manufacturing Company" all their machinery, patents, etc., for the manufacture of the Brundage Patent Horse Nails, and have removed the machinery from Middletown to Cortland, N. Y.; and with additions of new machinery and largely increased facilities, we shall manufacture Horse Nails equal in all respects to those made by the former company, and shall continue to make the only really forged Horse Nail in the market.

These Nails are forged from the best Norway Iron by a succession of blows, substantially the same as Nails forged by hand.

Cortland (late Brundage) Forged Horse Shoe Nails.

No.	10,	9,	8,	7,	6,	5,
℔ M	21c.	22c.	23c.	24c.	26c.	29c.

In lots of 500 lbs. 5 %
In lots of 1000 lbs. 7½ %
In lots of 2000 lbs. 10 %
In lots of 5000 lbs. 12 %

New York Forged Horse Shoe Nails.

No.	10,	9,	8,	7,	6,
℔ M	12c.	13c.	14c.	15c.	17c.

Net Cash.

Your orders or any inquiries will receive prompt attention, addressed to

EDWARD PHELAN, Agent,
113 Chambers Street, New York.

J. Clark Wilson & Co., 81 Beekman street, have a full stock of the following Sleigh Bells, loose or strapped, which they quote at discount 25 per cent. These are in addition to their list of Sleigh Bells published in our issue of last week:

Loose Round Polished Sleigh Bells.

Nos	0	1	2	3	4	5	6
Per doz	$0·25	·28	·37	·50	·60	·70	·80
Nos	7	8	9	10	11	12	13
Per doz	$1·00	1·15	1·36	1·60	1·80	2·16	2·56

Open Sleigh Bells, Polished.

Nos	0	1	2	3	4	5
Per doz	$0·45	·55	·68	·96	1·24	1·65

Open Sleigh Bells, White Metal.

Nos	0	1	2	3	4	5
Per doz	$0·48	·58	·72	1·00	1·30	1·73

Body Straps, Polished Bells—One Row.

	Each.
No. 7, 24 No. 0, Round Bells on Back, and 11 Round Bells Assorted for Belly	$1·75
No. 8, 24 No. 0, Round Bells on Back, and 11 Open Bells Assorted for Belly	1·80
No. 9, 20 No. 1, Round Bells on Back, and 11 Round Bells Assorted for Belly	1·75
No. 10, 20 No. 1, Round Bells on Back, and 11 Open Bells Assorted for Belly	1·80
No. 12, 24 No. 1, Round Bells on Back, and 11 Round Bells Assorted for Belly	1·90

Neck Straps—With Round, Polished Bells.

	Each.
No. 66, 15 No. 3 Round Bells	$0 25

Fancy Body Straps—Enameled Leather, Bound Edges, Extra White Metal Bells.

	Each.
No. 292, 30 No. 3 W. M. Bells	$3·50
No. 294, 30 No. 2 W. M. Bells	3·00

Chase's Patent Sleigh Bells—Neck Straps.

	Each.
No. 411, 15 Polished Bells, extra size and quality 4 to 11, assorted	$2·40

Body Straps—Polished Bells.

	Each.
No. 445, Russet or Polished Leather, Plain, 30 No. 1 Bells	$2·60
No. 447, Russet or Polished Leather, Plain, 30 No. 2 Bells	3·00
No. 453, Russet or Polished Leather, Stitched, 30 No. 1 Bells	2·85
No. 451, Russet or Polished Leather, Stitched, 36 No. 1 Bells	3·07
No. 455, Russet or Polished Leather, Stitched, 30 No. 2 Bells	3·25
No. 456, Russet or Polished Leather, Stitched, 36 No. 2 Bells	3·55

Extra White Metal Bells.

No. 533, Russet or Polished Leather, Cloth Bound, 36 No. 1 Bells	3·75
No. 534, Russet or Polished Leather, Cloth Bound, 42 No. 1 Bells	4·05
No. 535, Russet or Polished Leather, Cloth Bound, 30 No. 2 Bells	4·03
No. 541, Russet or Polished Leather, Cloth Bound, 24 No. 4 Bells	4·61
No. 547, Russet or Polished Leather, Leather Bound, 30 No. 2 Bells	4·33
No. 548, Russet or Polished Leather, Leather Bound, 36 No. 2 Bells	4·74

Silver Plated Bells.

	Each.
No. 589, Russet or Polished Leather, Plain, 54 No. 0 Bells	$5·33
No. 605, Russet or Polished Leather, Stitched, 36 No. 0 Bells	4·30
No. 609, Russet or Polished Leather, Stitched, 30 No. 1 Bells	4·25
No. 613, Russet or Polished Leather, Stitched, 30 No. 2 Bells	4·88
No. 645, Russet or Polished Leather, Leather Bound, 48 No. 0 Bells	5·65
No. 648, Russet or Polished Leather, Leather Bound, 36 No. 1 Bells	5·25
No. 652, Russet or Polished Leather, Leather Bound, 36 No. 2 Bells	6·00

They have also a very saleable Strap, with common round Tinned Bells, as follows:

	Each.
No. 152, Polished Leather, Cloth Bound, 36 No. 1 Tinned Bells	$2·00
No. 153, Polished Leather, Cloth Bound, 30 No. 2 Tinned Bells	2·00
No. 154, Polished Leather, Cloth Bound, 28 No. 3 Tinned Bells	2·00

BRITISH IRON MARKET.

(Specially reported by cable for The Iron Age.)

WEDNESDAY, Dec. 8, 1875.

Scotch Pig.—There is a very brisk demand, and a large business has been done. Prices are firmer. The following are makers' quotations:

Gartsherrie No. 1	74/
Coltness No. 1	77·6
Glengarnock No. 1	70/
Eglinton No. 1	64·6

Manufactured Iron and Rails—are without change of importance to note.

IRON.

American Pig.—We have again to report a decline in the price of American Pig, the best being now sold at $23, and even at this price there seems to be little confidence that the bottom has been reached. We learn of the following sales: 500 tons No. 1 Allentown, $23; 1000 tons No. 1 Thomas, $23; 500 tons No. 1, $24; 750 tons Forge, $19; 200 tons Forge, $15·50. We quote No. 1 Foundry, $23; No. 2 Foundry, $21; Gray Forge, $15·50 @ $20.

Scotch Pig.—Since our last the arrivals have been small, and the sales too small to report. We quote: Coltness, $33; Glengarnock, $31; Eglinton, $29·50 @ $30.

Rails.—Iron Rails can be bought at from $42 to $46, at mill, according to quality and location. Some remote mills are holding as high as $50. We note the sale of 4000 tons by the Roane Iron Company, at Chattanooga, on private terms. The Lackawana Iron and Coal Company have about completed their steel works, which are among the best arranged in the world, and they are now in the market for orders for Bessemer Steel Rails.

Old Rails.—There has been nothing done in our market since the sale at $22·50, reported two weeks ago. Holders ask $24 to $25, which price would probably have to be payed by a buyer, but if the holders desired to realize, they would have, in all probability, to take considerably less.

Scrap.—There is no change to report in the market, and we hear of no transactions. We quote as before, $30 @ $31.

METALS.

Copper.—Sales on the spot foot up for the week some 350,000 pounds Lake Superior at 23¾c. @ 23½c., which is the closing figure, while Baltimore is quiet at nominally 23½c. Nothing has transpired in sales for future delivery, navigation being closed and nobody offering anything. People who have neglected buying futures would make no effort to secure any at present, but prefer to take their chances and wait till they require a fresh supply. Most of the concerns are now busy in preparing their balance sheet for the close of the year, and, as in the case of companies, the present directors may in some instances not feel sure of being re-elected, they will, of course, shrink from making engagements in the shape of purchases at this juncture. Copper prices remain firm, the offerings being light. In Europe it is, from late accounts, not quite as easy to uphold current values, business there being excessively dull since the close of navigation. Still present holders seem to have confidence in the article, and are averse to selling at a loss. No later telegrams are to hand. The President, in his message, remarks about metals that Lead, Zinc and Copper, from being articles of import, we may expect to be large exporters of in the near future. The same document, after recommending the reimposition of the duty on coffee and tea, contains the following passage: "With this addition to the revenue, many duties now collected, and which give but an insignificant return for the cost of collection, might be remitted, and to the direct advantage of consumers at home. I would mention those articles which enter into manufactures of all sorts. All duties paid upon such articles go directly to the cost of the article when manufactured here, and must be paid for by the consumers. These duties not only come from the consumers at home, but act as a protection to foreign manufacturers of the same completed articles in our own and distant markets." This passage has been construed by some as alluding to the duty on Copper and Lead, although the President mentions no article in particular. But however this may be, the opinion in commercial circles seems to be that, for political reasons, neither party in Congress cares to undertake a remodelling of the tariff during the present session. The manufactures of Copper are unchanged as follows: New Sheathing, 30c.; Bolts and Braziers, 31c.; Nails, 38c. @ 39c.; Bronze and Yellow Metal Sheathing, 21c.; Yellow Metal Bolts, 28c.; and ditto Nails, 21c., net, cash.

Tin.—The mail accounts and telegrams from the other side are not favorable to the maintenance of current rates among us. Shipments of English Tin this way, which had been neglected pretty much during the whole year, are suddenly being resumed quite extensively, and together with liberal arrivals of Straits and more coming by steamers through the Suez Canal bound to New York, constitute quite a decent amount of visible supply. The consequence is considerable weakness, actual wants not being of an urgent character. We have a very quiet market, and reduce gold quotations, of the leading sorts, as follows for large lots: Straits, 19¼c. @ 19¾c.; English Refined, 19⅝c. @ 19⅝c.; ditto Common, 19⅛c. @ 19¼c.; and Banca, 23¼c. London, since our last report, has been fluctuating £1 up and down daily, and closes at £82 for Straits. Statistics, as communicated to us per cable, are unfavorable; thus the stock at London had reached 6000 tons, the deliveries there in November having been but 1200 tons, a decrease of 800 tons, as compared with the previous month. Telegraphic advices from Perak present no new feature. According to the London written advices, Perak produces but 60 tons monthly, and Larote 300. It is mentioned that the country is so rich in Tin that something very extraordinary must occur ere the Chinese miners will abandon a region which repays their labor better than any other. *Tin Plates.*—As we have had occasion to remark repeatedly within the past month or two, there is no article that we know of as favorably situated in this country and England as plates are at the ridiculously low figures to which they have been permitted to decline. The larger importers and dealers are now fully imbued with this truth, hence an undercurrent of growing confidence and strength. Faith in the article is stronger even in Europe than here. We quote on an active, but remarkably firm market, gold, per box, large lines, ordinary brands: Charcoal Bright, $7·37½ @ $7·50; do. Terne, $7·12½ @ $7·25; Coke Tin, $6·50 @ $6·75; and do. Ternes, $6·25 @ $6·37½.

Lead.—Since the late movement in Domestic Lead the market has quieted and softened down a little, sales not exceeding 200 tons, at 5⅞c. @ 6c., gold. For a larger lot, if to be sold, 5¾c., gold, would probably be the outside rate obtainable. Foreign is nominal and inactive. According to a letter from Aix la Chapelle, Rhenish Prussia, dated November 22d, which we have read, Lead in that vicinity was firmer, and a decidedly upward turn was expected. As regards the Lead business between Europe and the United States, we would mention that strenuous efforts are likely to be made by the Mediterraneans (Spain and Marseilles) to establish this trade on a more extensive footing in the near future. They seem determined to do a larger export trade in the metal this way, even at the expense of some sacrifice at the outset. The shipping opportunities thence are now more frequent and regular, and Lead is shipped at a low rate. Manufactures of Lead are sustained at the following prices: Bar, 8¾c.; Pipe, 9c.; and Sheet 9½c., less 10 per cent. discount.

Spelter and Zinc.—We are assured by reliable parties that this entire combination affair is a mere farce, and that contracts have been made at 7·40c., currency, less 5 per cent. instead of less 1 per cent. The fact is that trade in the article has been very dull all along, and the same during the week under review, and that if the above assertion be true, which we have no reason to doubt, quotations are in reality quite unsettled and nominal. Of Foreign, 70 tons Stolberg sold at a price not transpired. Limits for Silesian remain 7 15c. @ 7·40c., gold. Accounts by mail from Hamburg, dated November 23d, inform us that since the Bank of Prussia reduced its discount to 5 per cent., a large speculative purchase has been made by one firm, at Breslau (Silesia), of together 40,000 cwts. Godulla and P. H., January delivery, at the high figure of 24 marks, and that there are more buyers, the asking figure now being 24·10 marks. The present quotation of Silesian Spelter is below the cost of importation. Sheet Zinc is quiet at 9c., gold, as is usually the case at this season of the year.

Antimony—Although not active, remains steady at 14c. @ 14½c., gold, as to quantity. The proposed raising of the price at London from £59 to £62 will, we are told, only take effect dating from January 1, 1876.

COAL.

We have no perceptible change to report in the condition of this market since last week. The retail demand for Anthracite still continues active, but cargoes are dull, owing to the sudden close of navigation. The combination prices remain the same as in the month of November.

The quantity of Coal shipped from the Schuylkill region during the past week was, by rail, 107,010 tons; by canal, 29,128 tons; total, 136,138 tons, against 118,566 tons for the corresponding period of last year. Increase, 17,572 tons. The quantity for the year was by rail, 3,584,312 tons; by canal, 725,253 tons; total, 4,309,565 tons, against 4,608,856 tons for the previous year; decrease, 299,291 tons.

The quantity sent from all the regions during the week was: Anthracite, 591,566 tons; Bituminous, 90,083 tons; total, 981,694 tons, against 467,168 tons Anthracite, and 74,497 tons Bituminous for the corresponding period of last year. Increase of Anthracite, 124,380 tons; increase of Bituminous, 15,586 tons. Total increase, 139,966 tons.

The quantity sent from all the regions for the year was: Anthracite, 22,605,768 tons; Bituminous, 3,621,020 tons. Total, 26,226,788 tons, against 22,380,250 tons Anthracite, and 3,381,071 tons Bituminous; total, 25,762,221 tons, for same period last year. Increase of Anthracite, 225,518 tons; increase of Bituminous, 239,949 tons. Total increase, 464,567 tons.

The following are the prices charged by the Lehigh and Wilkesbarre Coal Company for Coals, delivered f.o.b. vessels at Port Johnston, N. J., during the month of December. The Company reserves the right to change the same at any time, except on contracts made prior to such variations:

	Lump.	Steamer.	Broken.	Egg.	Stove.	Chestn't.	Chestn't, No. 2
Old Co.'s Summit	5 55	....	5 55	5 65	6 10	5 10	4 60
Honey-Brook Lehigh	5 55	....	5 55	5 65	6 10	5 10	4 60
Wilkesbarre	5 05	5 15	5 25	5 05	6 10	4 95	4 60
Plymouth Red-Ash, net	....	....	5 25	5 65	6 10	4 95	4 60

We quote as follows: Anthracite, $4·95 @ $6·10; Cumberland, $6·25 @ $6·75; West Virginia, $6·75; James River Steam, $6·25; James River Carbonite, $9 @ $9·50; Kanawha House, $11·50; American Gas, $6·75 @ $7·25; American Cannel, $12 @ $14; Pennsylvania and West-

moreland, $6·75; Newburgh Orrel, $6·50; Sterling Ohio, $10; Ince Hall, $17 @ $18; Liverpool House Cannel, $17; Liverpool Gas, $12; Newcastle Gas, $7; Scotch, $7·60.

The Coal transported over the Cumberland Branch Railroad during the week ending Dec. 4, 1875, amounted to 5890 tons, as against 7163 tons shipped in the corresponding period of last year, showing a decrease of 1273 tons. Over the Cumberland & Pennsylvania Railroad, for the same period, the shipments were 31,476 tons, against 29,333 tons shipped in 1874, an increase of 2134 tons. The aggregate amount of Cumberland Coal shipped by the various companies so far this year amounts to 2,193,058 tons.

OLD METALS, PAPER STOCK, &c.

Nothing of importance has occurred in the market for Old Metals, Paper Stock, and other Junk Materials during the period that has elapsed since the date of our last. There has been a slight call for some articles, but as a whole the market is extremely quiet. Grass Rope still continues in good demand, and is scarce in the market. We quote the following as the current purchasing rates:

Old Metals.—Copper, 16c. @ 17c. per lb.; Yellow Metal, 11c.; Brass, 10c. @ 12c.; Composition, heavy, 13c. @ 14c.; Lead, solid, 5¼c.; Tea Lead, 5c.; Zinc, 4¼c. @ 4½c.; Pewter, No, 1, 18c.; do., No. 2, 8c. @ 12c.; Spelter, 5¼c., Wrought Iron, 1c.; Sheet do., ¼c.; Cast, do., ¼c.; Machinery, do., ¾c.

Rags, &c.—Canvas, Linen, 4¾c. @ 5¼c.; do. Cotton, No 1, 5¾c. @ 6¼c.; No. 2, 2¼c.; White, No. 1, 6¼c.; No. 2, 4c.; Colored, do., 2c. @ 2½c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 5c. @ 5½c.; Gunny Bagging, 1¾c.; Jute Butts, 1¾c. @ 2c.; Kentucky Bagging, 3c.; Book Stock, 3c.; Waste Paper and Scraps, 1½c.; Kentucky Bale Rope, 4c.; Oakum Junk, No. 1, 4½ @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c. @ 1¼c.; Grass Rope, 2½c. @ 3c.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending Dec. 7, 1875:

Hardware.

Barstow E. W. & Sons, Chains, cks., 2 Lengths, 3
Crabb Wm, Steel wire, bdls., 32
Degraw, Aymer & Co. Chains, cks., 4 Chains, lengths, 1
Fuller Bros. Chains, cks., 12
Field A. & Co. Anvils, 207 Chains, cks., 51 Casks, 11 Cases, 18
Frasse P. A. & Co. Files, cks., 2 Mdse. pkgs., 4
Hendricks Isaac, Wire, cs., 13
Kelter L. H Casks, 1
Lennox E. S. & Co. Ties, lots, 406
Laughland & Co Netting, cs., 1 Wire, pkgs., 4
Mason John W. & Co. Wire rope, coils, 5
Moore Henry, Files, cks., 8
Squires H. C. Guns, cs., 1
Order. Files, cks., 4

Iron.

Henderson Bros. Pig, tons, 100
Laughland & Co. Haybands, bdls., 400
Lang W. Bailey & Co. Mdse. pkgs., 6
Schmeisser & Bender, Spiegel, tons, 270
Order. Beams, 193 Sheet, bxs., 67

Steel.

Haight J. Lloyd, Bundles, 436
Naylor & Co. Tires, 14 Mdse. pkgs., 36
Robbins C. & Sons, Bundles, 63
Order. Bundles, 71 Cases, 6 Bars, 3

Metals.

Bruce & Cook, Mdse. pkgs., 200
Cort N. L. & Co. Tin plates, bxs., 500
Darrell & Co. Barrels, 1 Pieces, 2
Lamarche H. Zinc, cks., 120
Phelps, Dodge & Co. Tin plates, bxs., 3893 Black plates, bxs., 15 Mdse. pkgs., 1950
Probst F. & Co. Lead, pcs., 1502
Order. Tin, slabs, 190 Tin and terne plates, bxs., 1793 Tin, ingots, 874 Tin, cs, 2 Tin plates, bxs., 670

PHILADELPHIA.

PHILADELPHIA, Dec. 7, 1875.

The market is quiet, without any especial change in prices or in the volume of business. We hear reports of very large sales of Pig Iron at very low prices, but, when traced up, these are generally found to be rumors only. It would not seem possible for prices to go any lower, but some buyers appear to expect this to be the case, and to be still holding off for iron absolutely needed by them for winter use. The Pig Metal stocks are not large, and will not be increased this winter. The movement, if movement it can be called, is principally in Rails, of which there have been some considerable lots placed both East and West. Among these are several thousand tons for Arkansas roads, notably the Fort Smith and Little Rock Railroad. Prices for Iron Rails seem to be sensibly better West than here, and most branches of the Iron trade similarly more encouraging. Old Rails are getting scarcer. We hear of some transactions in New York as low as $22, but sales here at $25 to $26 cannot be duplicated, and holders are very firm now at $27 to $28. In Wrought Scrap there is no improvement, but there have been considerable lots of Cast sold at better prices than hitherto, and considerable inquiry. Prices are hard to quote reliably, but about as follows:

PIG IRON.—No. 1 Foundry, $23 to $24; No. 2, $21·50 to $22; Gray Forge, $21 to $21·50.

BARS.—2·4c. per lb.

RAILS.—$42 to $46.

OLD RAILS.—$26 to $27 to $28.

SCRAP, No. 1 Wrought, $29 to $30; Cast, $18·50 to $20.

We note sales of between 6000 and 7000 tons, all grades, of Pig Iron for the week at about our quotations; 4000 tons Rails for Southwestern delivery; 7000 tons among Western roads, and 3000 tons for nearby and Eastern roads, all at or a shade below our figures; 800 tons Old Rails at $22 in New York, and 500 tons here at $26, with $27 to $28 now asked; 200 tons Wrought Scrap at $29; 1000 tons Cast Scrap at $20, and 500 tons do. at $18·50, as to quality and selections.

PITTSBURGH.

PITTSBURGH, Dec. 7, 1875.

PIG IRON.—Trade continues exceedingly dull, and there is no prospect during the remainder of this year. Some well informed operators do not look for much of an improvement until the spring trade fairly opens up. Business is more depressed now, so far, at least, as Pittsburgh is concerned, than it has been at any time since the panic. Prices continue weak, and while there has been no quotable change within the past week, all grades have dropped from $1 to $1·50 per ton during the past month, and the tendency is still downward. The feeling very generally prevailed among operators here, during the summer and fall, in view of the very light production and steady reduction in stock, that hard-pan had been reached, but the subsequent course of the market has demonstrated that they were mistaken, and being so badly deceived in regard to the past, they have now but little confidence in the future. Bituminous Coal smelted and Coke Irons are quotable as follows: No. 1 Foundry, $24 to $25, 4 months; No. 2, do, $23 to $24; Gray Forge, $22 to $23; White and Mottled, $20 to $21. Charcoal Mill, $23 to $24; No. 1 Foundry, $27 to $29; Cold Blast Car Wheels, $30 to $35 for Eastern, and $40 to $50 for Western. Considerable Charcoal Iron has arrived by river within the past week, but the receipts of Bituminous from the Shenango and Mahoning Valleys continues very meagre.

MANUFACTURED IRON.—The general situation has undergone but little change recently, and it is certain there has been no improvement; manufacturers generally report that it is getting worse. It is true the cost of production has been considerably reduced, but with the exception that it enables our manufacturers to cope with competing points, it has no very great advantage, as prices have been reduced correspondingly. Merchant iron is lower now than it has been at any time since the war, and it is said, by those who are in a position to know, that none of the mills working exclusively on merchant iron can get their own money out of it; those mills fortunate enough to have specialties are possibly making a little money, but with the others it is different.

NAILS.—Orders are coming forward very sparingly, and it is not likely that there will be any decided improvement until the spring trade opens up, which takes place about the 1st of February; December and January are usually dull months in the Nail trade. Prices weak and drooping; $2·75 to $2·80, 60 days, with two per cent. off for cash.

STEEL.—The market for Steel is less active, although it is about all that can be expected, as the demand usually falls off at this particular time. However, for some grades, including that used in the manufacture of agricultural implements, some of our manufacturers are pretty well supplied with orders. Our manufacturers generally have had about all they could do all this year, and while, in consequence of an active competition, the margin for profit has been comparatively light, there is reason to believe that they have made some money.

SCRAP IRON continues exceedingly dull, and there is not much prospect of any change for the better soon, unless there should be a lock-out, which is hardly probable. No. 1 Wrought Scrap quoted nominally at 1·30, 4 months. The last sale of Old Car Wheels reported was $21 to $22, 4 months, losing the seller from $4 to $5 per ton.

THE HITCH BETWEEN THE PUDDLERS AND MANUFACTURERS.—The complications which have arisen between the puddlers and manufacturers have not yet been adjudicated, although it is probable the matter will be disposed of within the next few days. The manufacturers propose to pay $4·50—50 cents per ton less than they are now paying and $1 less than in October. The puddlers have signified their willingness to work away at $5, but this, the manufacturers say, they cannot and will not pay, and unless the puddlers conclude to accept the $4·50 a lock-out is probable, but the probability is that the puddlers will yield. The mills, as a rule, are in a much better condition than they were at this time last year, as they have but few orders, and, beside, a reduction in the production for a time, it is believed, would have a good effect.

The Pittsburgh *Commercial*, of Dec. 4th, says: The market for pig metal continues very dull, with no quotable change in prices since our last report. We are reported the following sales:

BITUMINOUS COAL SMELTED FROM LAKE SUPERIOR ORE.

300 tons neutral forge	$22·50—4 mos.
100 tons white	20·50—4 mos.
100 tons gray forge	22·50—4 mos.
100 tons white	21·00—4 mos.
80 tons extra red short	24·00—4 mos.
50 tons gray forge	23·00—4 mos.

CONNELLSVILLE COKE.

100 tons gray forge	$22·50—4 mos.
50 tons gray forge	22·50—4 mos.
10 tons No. 2 foundry	23·00—cash.
10 tons No. 2 foundry	24·00—4 mos
10 tons No. 1 foundry	25·00—4 mos.
10 tons No. 2 foundry	24·00—4 mos.

CHARCOAL.

180 tons, Nos. 1 and 2 H. R.	private terms

CHATTANOOGA.

CHATTANOOGA, Dec. 2, 1875.

To the Editor of The Iron Age.—Times are getting no better with us very fast through this section. The tide of current events appear to neither ebb nor flow, but quiet appears to be the password along the entire line. There may be a few local currents, or counter currents, a little loss or a little gain of certain furnaces, but as a general thing those that are running are pursuing the even tenor of their ways, economizing as much as possible, and selling their product as near cash as they can. In the movements of Metals there were shipped from this place (local and through) in the month of October 3240 tons to points North, West and South. In the item of Iron Ores there were shipped to the Ohio River 510 tons during the same period. During the month that has just passed, *i. e.* November, there were shipped from here, of both local and through shipments, of Pig Iron 2950 tons, and of Iron Ore 1160 tons; the Ore principally to the Ohio River, while the Metal has found a market all along the Ohio River, also Chicago, St. Louis, and some of the interior Western towns, also Memphis and some of the Southern cities. The railroads, as a general thing, are extending the most liberal facilities to the shippers of Metal, Coal, and Iron Ores. A basis of one cent per ton per mile is the general rate, while in some instances a concession even from this is made, especially upon shipments of ore. Some transfers of mineral lands are being made—a fine coal and iron property a few miles above here, on the Tennessee River, also on the line of the Cincinnati Southern Railroad, has been recently purchased by an English company for $125,000, and most of the money paid down. From appearances the English capitalists are investing slowly, but surely, through this section. There is now being erected by General Wilder a forge in East Tennessee to manufacture Bar Iron from certain special ores found up there, which is contracted for in England at a price equivalent to $180 of our money per ton, delivered there. The entire plant, which is nearly completed, will cost about $50,000. The general is anticipating large profits from this enterprise, which has every appearance of being realized, for the cost of the manufacture is no more than in any other locality, the large price being attributed entirely to the superior quality of the ores. Sales of metal are now being made in this district at about $14 for low grades of forge, up to $20 and $22 for best grades of American Scotch. With the exception of certain specialties for which our metals are required, such as car wheels, &c., the Coke Iron that is now being made in this district is sought for by the manufacturers as much as that made from Charcoal Fuel. As an evidence that our section is attracting the attention of consumers from which to draw their supply, one of the largest consumers of metal wrote here last week, seeking information upon what basis he could contract, for the coming year, for his entire supply.

BOSTON.

DEC. 4.—*Pig* has had a dull week again. The reports of failures and extensions of two or three prominent Western founderies have made holders much more conservative in their offerings, and the market, wanting hammering for sales, settles into its now apparently normal condition, which is dullness. The reports that come to us from New York on sales and quotations are somewhat conflicting, but there is no reason to doubt but that the best brands of No. 1 are obtainable at $24, No. 2 at $22, and Gray Forge at $18 to $19, and even on these some leading buyers are confident of shadings. The market values here are nominally for No. 1, $24 to $26; No. 2, $22 to $24; Gray Forge, $19 to $21. *Bar* is without improvement. The demand is small, chiefly from blacksmiths, this week, while the prices hang at $55 to $57 for Refined and $51 to $53 for Common. *Steel* is moving in a small and steady way. The series of tests which the Nicholson File Company are making, to determine the true worth of the various brands of Steel and of Files is about completed, and begins to attract great attention. We quote: American Tool, 14c. to 15c.; American Machinery, 9c. to 9½c.; Bessemer Tires, 6¾c. to 7¼c.; Sweet's Excelsior Tire, 8½c. to 12c.; English Tool, 16c. to 18c., gold.

ST. LOUIS.

Messrs. SPOONER & COLLINS, Iron commission agents, 409 North Third street, St. Louis, under date of Dec. 2, report the Iron market as follows: Our market still presents the gloomy appearance that we repored last week, though we have every reason to believe that the trade for 1876 will be much better, both in demand and price, and we look for better times upon the opening of business next year.

Mo. Stone Coal, No. 1 F'dry	$26·50 @ 27·00—4 mos.
" " No. 2 F'dry	24·00 @ 25·00—4 mos.
" " Gray Mill	23·50 @ 24·00—4 mos.
" Charcoal, No. 1 F'dry	26·00 @ 27·00—4 mos.
" " No. 2 F'dry	23·50 @ 24·00—4 mos.
" " Gray Mill	23·00 @ 24·00—4 mos.
Tenn. Charcoal No. 1 F'dry	25·00 @ 26·00—4 mos.
" " No. 2 F'dry	23·00 @ 24·00—4 mos.
" " Gray Mill	22·00 @ 23·00—4 mos.
" Coke Iron No. 1 F'dry	25·00 @ 26·00—4 mos.
" " No. 2 F'dry	23·00 @ 24·00—4 mos.
" " Gray Mill	23·00 @ 24·00—4 mos.
H. R. Charcoal No. 1 F'dry	26·00 @ 27·00—4 mos.
H. R. " No. 2 F'dry	24·00 @ 25·00—4 mos.
H. R. " Gray Mill	24·00 @ 25·00—4 mos.
Massillon Iron, A, No. 1	34·00 @ 35·00—4 mos.
" " B, No. 1	32·00 @ 33·00—4 mos.
" " No. 2	30·00 @ 31·00—4 mos.
Cold Blast Car Wheel, Mo.	32·00 @ 35·00—4 mos.
" " Tenn.	30·00 @ 32·00—4 mos.
" " Ala.	30·00 @ 32·00—4 mos.
" " Hanging Rock	35·00 @ 40·00—4 mos.
Mo. Charcoal Blooms	60·00 @ 65·00—4 mos.
" Scrap	60·00 @ 65·00—4 mos.
Mo. Charcoal Hammered Billets	80·00 @ 90·00—4 mos.
Assorted Bar Iron	2 4-10 rate.
No. 1 Wrought Scrap	1c. per lb.
Heavy Cast "	¾c. "
Light Cast "	½c. "

CINCINNATI.

Messrs. L. R. HULL & Co., under date of Dec. 6, write us as follows: PIG IRON.—The market remains quiet, and no marked activity is anticipated before the close of the year. The demand for all grades is very fair, except Cold Blast Irons, which are quiet. Quotations remain without material change.

HOT BLAST CHARCOAL.

Hanging Rock No. 1	$25·00 @ 26·00—4 mos.
" " No. 2	23·00 @ 24·00—4 mos.
" " Forge	21·00 @ 22·00—4 mos.
Southern Brands No. 1	23·00 @ 24·00—4 mos.
" " Forge	21·00 @ —4 mos.
Virginia No. 1	24·00 @ 25·00—4 mos
" No. 2	22·50 @ 23·00—4 mos.
" Forge	21·00 @ 22·00—4 mos

HOT BLAST STONE COAL AND COKE.

Hanging Rock No. 1	$23·00 @ 24·00—4 mos.
" " Forge	21·00 @ —4 mos.
Red Short No. 1	27·00 @ —4 mos.
" Forge	24·00 @ —4 mos.
Am. Scotch, No. 1	24·00 @ 25·00—4 mos.

COLD BLAST CHARCOAL.

Hanging Rock Car Wheel	$40·00 @ 50·00—4 mos.
Missouri " "	35·00 @ 40·00—4 mos.
Southern Br'ds " "	30·00 @ 40·00—4 mos.
Machinery and Forge	30·00 @ 35·00—4 mos.
Blooms	@ —4 mos.

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, Richmond, Va., writes as follows under date of Dec. 4: The season's business in Charcoal Irons has about closed. Receipts very light, and stock in hand very small.

Virginia cold blast Charcoal Pig Irons	$37·00 @ 38·00
" hot " " "	24·00 @ 28·00
Va. hot blast Coke Pig Iron, No. 1 ex.	24·00 @ 25·00
" " " " No. 2 ex.	22·00 @ 23·00
" " " " No. 3 ex.	21·00 @ 22·00
Virginia Anthracite. No. 1 ex.	25·00 @ 26·00
" " No. 2 ex.	23·00 @ 24·00

BALTIMORE.

Messrs. R. C. HOFFMAN & Co., Iron and commission merchants, Nos. 23 and 25 South Frederick street, report the Pig Iron market as follows, under date of Dec. 6: The Iron market continues dull and depressed, with light sales. We quote:

Baltimore Charcoal	$32·00 @ 35·00
Virginia "	30·00 @ 34·00
Anthracite No. 1	24·00 @ 25·00
" No. 2	22·00 @ 24·00
" No. 3	20·00 @ 22·00
White and Mottled	18·00 @ 19·00

Messrs. WYETH & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, report us the following prices under date of Dec. 7: We have no change to note in our market for the past week. Business continues about same as last reported, and with no prospect of any improvement for the present.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ⅜ to 1 thick	2 5-10 to 2 6-10c. ₩ lb.
1 to 4¼ wide by 1¼ to 2 thick	
Round and square, ordinary sizes, from ¾ to 2 inclusive	2 5-10 to 2 6-10c. "
Hoop Iron, 1¼ wide and upward	3¼ to 4c. "
Band Iron, from 1¼ to 4 in. wide	3 to 3¼c. "
Horse Shoe Iron ¾ to 1 wide by ⅜ to ½ thick	3¾ to 4c. "
Norway Nail Rods	7 to 7¼c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	15¾ to 16c. "
Machinery Steel	11 to 11¾c. "
Cast Spring Steel	10 to 10¾c. "
Homogeneous Steel Plate	10¾c. "
Perkins' Horse Shoes, per keg of 100 lbs.	$5·12½
" Mule Shoes " "	6·12½

Common Horse Nails, from 14c. to 18c. per pound.

	10	9	8	7	6	
Putnam Horse Nails	23	24	25	26	28c.	per lb.
	10	9	8	7	6	
Globe Horse Nails	23	24	25	26	28c.	per lb.

R. R. Spikes.....5¼ by 9-16 at 2 9-10c to 3c. per lb.

LOUISVILLE.

Messrs. GEO. H. HULL & Co., under date of Dec. 4, writes us as follows: The market continues dull, sales being confined to Iron for immediate use. Prices are without change. The usual time, four months, is allowed on the quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores	$25·00 @ 26·00
" 2 " " " "	23·00 @ 24·00
" 1 Mill, " " " "	— @ —
" 1 F'dry, from Alabama, Georgia and Tennessee Ores	23·00 @ 24·00
" 2 F'dry, from Alabama, Georgia and Tennessee Ores	23·00 @ 23·00
" 1 Mill, from Alabama, Georgia and Tennessee Ores	21·00 @ 22·00

HOT BLAST STONE COAL AND COKE.

No. 1 F'dry, from Hanging Rock Ores	$23·00 @ 24·00
" 2 " " " "	22·00 @ 23·00
" 1 Mill, " " " "	21·00 @ 22·00
" 1 F'dry, from Alabama, Georgia and Tennessee Ores	23·00 @ 24·00
" 2 F'dry, from Alabama, Georgia and Tennessee Ores	22·00 @ 23·00
" 1 Mill, from Alabama, Georgia and Tennessee Ores	21·00 @ 22·00
No. 1 F dry, from Missouri Ores	24·00 @ 25·00
" 2 " " "	24·00 @ 25·00
" 1 Mill, " "	25·00 @ 26·00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores	35·00 @ 40·00
" " Tennessee Ores	28·00 @ 30·00
" " Alabama and Georgia Ores	28·00 @ 38·00
Car Wheel from Kentucky Ores	28·00 @ 40·00

FOREIGN.

FRANCE.

(Moniteur des Interets Materiels).

PARIS, Nov. 21, 1875.—*Metals.*—The political horizon has become overclouded once more, and a good many rumors to that effect have been in circulation, calculated to make people in the metal line shrink from larger transactions. Meanwhile the money market is working with greater ease, as has been observed many a time during the past two years, whenever the paralyzation in active business is becoming intensified. Failures in England have been so frequent this year among firms of note, and the few prominent ones on the Continent have carried with them such widespread disaster, that all thought of an early revival in business has been abandoned. Many large establishments have striven to continue manufacturing, even with the prospect of barely making the two ends meet, in hopes that the fall trade would compensate them for their perseverance; but they have only met with disappointment, and many from among them will have to curtail production for the sake of their own safety. Others will be compelled to lower wages, and as the workmen may not be reasonable in some instances, the usual labor troubles will ensue, with their final hardship to the operatives. With such prospects before us, the outlook is far from reassuring, and during the winter metal values will have to undergo a severe test, especially those more subject to speculative influences, while the few more favorably situated ones, whose production does not keep pace with the demand for actual consumption, are likely to be sustained. It would be idle to indulge in hopes and expectations as to the spring opening at this early stage; we have been so often lured with assurances, that in a couple of months a favorable change would occur, to no purpose, that the only true policy seems to be to grapple with existing difficulties, and let the future work out its own salvation in due time. The *Copper* charters for the forepart of November are again quite liberal, say 2100 tons, and do not help the metal much as it is situated, nor are the English Board of Trade returns for the ten months favorable, being 65,865 tons imports, against but 42,891 exports, while in 1874 they were 60,391 against 51,250. Some business has resulted in our own midst in ordinary Chill Bars and Corocoro ore at 212·50 to 213·75 francs. We quote good bars 217·50; ingots, 222·50, and English Tough Cake, 222·50. Marseilles reports a good market, facilitating the sale of a lot of Tokat afloat. The latter is quoted 210, and small ingots command 215. *Tin*, which, on the receipt of the first news from Perak advanced £3 for Straits at London, has receded that much subsequently, when it was discovered that after all Perak reports but 60 tons monthly, and Larote 300. The rebellion would have to spread to the latter district and cause the Chinese miners to leave the country, ere the Tin supply diminished seriously in that quarter, and such an eventuality does not seem at hand. Smaller speculators for a rise have consequently, become sellers again, and their anxiety to realize causes the sudden downward movement at London. Few people, if any, have been misled into buying any Tin here on the strength of those first exciting telegrams, yet Banca is held with tolerable firmness at 237·50; Straits at 230, and English at 222·50. Marseilles is quiet at 220 for Straits and Billiton. In *Lead* there has been a protracted struggle between holders and consumers, but the unyielding firmness of the former at the decline thus far had, seems to carry the day, although within a day or two past the offerings have been free again here at 56·50 French, and 56 Spanish and English. At Marseilles the market is quiet; the opinion seems to prevail there that at the decline of 4 francs, which has taken place, the market may now be considered in a sound position. They quote Spanish 52·50 to 52·75. The demand for *Spelter* seems to be on the increase everywhere but here, where we remain at 65 francs the 100 kilos. *Iron.*—At this season of the year trade in the Iron regions of France is always slack, and business is now as dull as it possibly can be. Our Iron industry, taken as a whole, is, however, in a sound position, and has done wonders since the war, having weathered the adverse storms without government aid, better than any neighboring country. *Coal.*—There is a steady good demand, without much pressure to push Coal through to the consuming centers; the temporary break in the St. Quentin Canal, and the stoppage in the Marne-Rhine Canal consequently cause no great inconvenience. At the North and in the Pas de Calais there is a steady run of orders, and prices remain firm.

BELGIUM.

(Revue Universelle).

BRUSSELS, November 21, 1875.—*Iron.*—Some increase in the firm attitude assumed by Pig Iron holders, consequent upon a reported lessened production in the Cleveland district, had given rise to hopes that an advance was at hand in Belgium, but these expectations have come to naught. Consequently there is now some talk of discharging a certain number of hands in the Charleroi district; if determined upon, we hope that the movement will remain confined to that locality. As we are now compelled to cast around for new fields, we invite attention to the railroad line determined upon in Mexico between Leon and the Rio Grande. Another line is to connect Leon with the capital. Furthermore, the Poti-Tiflis line has been resolved upon, to connect Tiflis with Baku—all to be Steel Rails. It is supposed that the same company will be empowered to continue the line from Tiflis to Djulfa, in Persia. These Turkish-Persian roads will cost 24 000,000 roubles. A question much debated in government circles in Belgium is the substituting of Iron ties, cast or wrought, for wooden. Mr. Inland Danvers, Director General of Railroads in India, has adopted Iron in the place of wood wherever there was a scarcity of the latter, and where the soil, being light and sandy, recommended the preference of Iron to the exclusion of wood. Cast Iron ties have been preferable in many places; in Oude and Rohilkund, Wrought Iron. On the great Madras line the wooden ties have been removed and Iron has been substituted for them. Repairs have been less frequent, and the rolling stock has not suffered in the least since the change was made. *Coal.*—The question of a reduction of wages in the mining regions is now uppermost in the minds of producers. In England producers have not hesitated, but cut down wages between 12 and 20 per cent. despite the strikes, and they are now all the better able to compete with other countries. Nor is it reasonable that wages should remain where they were, when a couple of years ago the enhanced value of Coal caused them to appreciate correspondingly. We know full well that it is not an easy matter to lower wages, but if, on the other hand, the miner is to receive a living for his work, it cannot be expected that the owner of a mine should go on paying wages out of all proportion high, now that Coal has declined to such an unremunerative figure.

GERMANY.

(Cologne Gazette,)

BOCHUM (Westphalia), Nov. 20, 1875.—*Coal.*—The upward tendency in Coal continues, and may be kept up for a couple of weeks longer, till consumers have laid in their supply for household purposes. Prices are between 8 and 10 marks the 5000 kilos higher at present than they were in July last. The demand is of such a pressing nature that the Coal companies do not care to name prices for future delivery. We believe that they commit a great blunder in thus discarding more extensive contracts. They seem to lose sight of the fact that Iron industry in Germany is still suffering. *Iron.*—At the last opening of tenders at Breslau for the furnishing of Iron and Steel Rails to the railroad line of the right bank of the Oder, the former have been offered at 16 marks the 100 kilos, and the latter (Bessemer) at below 20 marks. These figures are so low that all outside competition is virtually cut off.

ESSEN, Nov. 19, 1875.—*Coal.*—Usually the Coal dealers and consumers all drop in together about this time of the year, and effect their purchases for a winter supply, and this is repeated in the present instance. A month ago Coal had declined to a very low point, and it was expected that some of them would have bought earlier by reason of the extraordinary cheapners then existing. But none bought, and in spite of the stagnation of Iron industry the demand is of such an urgent character just at present that it can be filled with difficulty only and at steadily rising prices, while freights are rising as fast. The stocks at Ruhrout and Duisburg are exhausted. Shafts are being deepened, but no new ones sunk.

(Borsenhalle).

HAMBURG, Nov. 20, 1875.—*Metals.*—Dealings are restricted, and nothing is perceptible of a favorable nature to extricate us from the torpor prevailing. Prices have varied little. There is no change in *Copper* here. It is quiet at Berlin at 90 to 93 marks the 50 kilos. Stettin remains steady at 95 to 100. Nothing has been able to stir up the *Tin* markets in Germany, which have taken little notice of the fluctuations abroad. We have remained unaltered here. Of Banca little has been sold during the week at Berlin, where the quotation of 93·50 is maintained, while English has brought 90·50. *Lead* has undergone no variations either here or at Stettin. Cologne has been weak and declined to 21·50, while at Berlin the metal has been firm at 23 to 24 marks. The stocks of *Spelter* are insignificant in Germany, and prices remain well sustained. At Cologne, Block brings 24·50 to 24·75, and Sheet, 27·50 to 28·50. Very little transpires at Breslau, where prices are, however, as firm as ever. Berlin is inactive and unaltered at 25 to 26 marks the 50 kilos for good to best Silesian.

HOLLAND.

(Koch & Vlierboom).

ROTTERDAM, Nov. 16, 1875.—*Tin.*—Banca spot has been done at 52 and 53 guilders, and November auction at 52 and 52½, at which figures more may be had. P. S., 23.—Quiet and without anything doing. Banca spot we quote 52 to 52½; November sale delivery, 52 to 52½; Billiton, spot, 50 to 50½; to arrive, 50 to 50¾.

EAST INDIES.

(Dummier & Co.)

BATAVIA, Oct. 14, 1875.—*Tin.*—On the 11th instant 10,035 piculs Billiton were sold at auction, and averaged 54·83 guilders, or, at the exchange of 11·70, the equivalent of £82. 16/ per ton, free on board, without commission or freight, but inclusive of insurance. The next sale will take place early in December. In Swedish *Iron* some transactions have taken place, but at a reduction on previous prices: English is in scarcely any request. *Copper.*—Sheathing has been sold to a limited extent. *Coals* are neglected. We quote English, 20; Australian, 13 to 14; and best quality, 20, and Scotch, 15·50 guilders per ton. *Exchange.*—We quote first-class credits, 6 months' sight on London, 11·70.

Gilfillan, Wood & Co.

SINGAPORE, Oct. 20, 1875.—*Tin.*—Although the London market has been pretty steady during the past fortnight, there has been no confidence in the metal, and, beyond a purchase early in the month at $24 per picul, there were no transactions until yesterday, when about 75 tons changed hands at $23·70 down to $23·50 per picul. There is still a considerable stock in first hands. *Tonnage.*—For New York, the St. Bernhard has been laid on at £2 for dead weight. For Boston there is no vessel loading, the Nehemiah Gibson having cleared. The steamers Glenlyon and Fleurs Castle are expected from China about the end of the month, en route for New York direct, and have between them engaged over 200 tons Tin at 25/ to 30/ per ton. The Glenartney, for New York, took 4580 Tin; the Nehemiah Gibson, 2486. *Exchange* has advanced to 4/2½ per $1, six months' sight, London.

(Aitken, Spence & Co.)

COLOMBO, Oct. 28, 1875.—*Plumbago.*—There is a considerable demand for Chips and Dust, which are scarce. The market keeps firm at about £14 for Lump, and £7 and £4. 10/ for above sizes respectively, first cost. *Tonnage.*—For America the Soteria sailed for Alleppee, to complete loading, 16th inst., and the British Constitution follows her to-day, direct for New York. The Union, 365 tons, at Galle, was recently fixed at 64/, and will be here shortly. P. S., Nov. 3d.—The market keeps firm. There is a moderate business doing, especially in the smaller sizes, and supplies very small. The British Constitution sailed 28th ultimo. *Exchange.*—1/10½ to 1/11.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

SHEFFIELD, ENG., Nov. 23, 1875.

RUMORS OF WAR

have been prevalent for a week or two past, and have had the effect of dispiriting such persons whose volatility had not previously been damped out under other of the many disquieting influences now at work on all sides. In London the rumors to which I have just alluded have had an exceedingly depressing effect upon business, many of the oldest members of the great commercial community which hovers around the Threadneedle street corner being convinced that there is much in the aspect of affairs in the East to give England anxiety. Russia, always astute, clever, masked and eminently unscrupulous, is massing troops in the southern portions of her territories, and has been doing so for several weeks past. The Russian railway companies have suffered so heavily in this way that they are said to have addressed a remonstrance to the Czar on the subject. Simultaneously there comes to us from St. Petersburg a solemn official denial of the alleged "movements of troops." The government hasn't been doing anything of the kind! Bless you, no! Of all the innocents the Muscovite is invariably the whitest and most pure, but get below the outside skin of policy and you are confronted by the most marvelous arrangements of cunning and intrigues ever devised—probably never constructed save in the mind of the Gortschakoff of the time being. Whether the Great Bear threatens the existence of Turkey or not is yet to be shown by the next movement on the chess-board. Turkey is, confessedly, a vile, foul, corrupted excrescence on the otherwise moderately decent European body, and everybody is agreed that it is time that the vagaries and misgovernment of the Moslems should cease. The question is, however, how to get rid of the incubus, and it is upon this granite rock that we split. Egypt, too, commands a great share of public attention in connection with the "Eastern" difficulty. The wiseacres say that as the Suez Canal is now our principal avenue to and from India we ought to "seize" Egypt, and either retain it as a dependency or "insist" upon its neutrality being guaranteed. Both these suggestions are, I think, essentially crude and ill-wrought, seeing that, in the first place, Egypt might be of no possible service to us even in a strategical sense; and, secondly, because the other European governments would certainly

never permit Great Britain to add so great a slice of the world's surface to her already overgrown colonies and possessions without a formidable armed protest. Whether any of these conjectures are destined to prove correct or not is not a point we can at present determine, but the results of the war rumors are so clearly apparent that we must be excused for looking rather closely into the possibilities of the immediate future. As traders of a somewhat keen order we know that Russia cherishes designs upon India—that "brightest jewel in the British crown"—and that with Turkey in her own hands it would not be a very difficult matter to annex all Asia Minor and Persia. Russia is a great power in the world, but its overgrown dimensions destroy much of its influence. No efforts can be truly formidable for any given length of time unless they are *concentrated*. It is the knowledge of this vital fact which has made Russia devote so much attention and money to the rapid development of her railway systems in Europe. It is the accomplishment of these improvements which renders the Russia of to-day ten fold more dangerous than at any previous epoch.

THE RAIL TRADE

is everywhere slack—with a few exceptions which do not affect the whole—and appears unlikely to revive for some months to come. In all directions the mills are being laid off and the workmen discharged. People both in and out of the trade say they cannot conceive why there should be so exceedingly limited a demand for rails. The world, say they, *must* be using and requiring more iron or steel of this class, hence it is amazing that so few of the orders are reaching this country. They urge that it is not competition altogether which makes matters so bad, inasmuch as a similarly dull state of things is current both on the continent of Europe and throughout the iron districts of the United States of America. Personally, and as a mere unobtrusive opinion, I cannot allege that I am surprised at what has come about in this particular branch of industry. Prior to 1865, or thereabouts, we know very well that iron rails were almost exclusively used in this country and elsewhere, but that subsequently these iron ones have been almost universally pulled up and replaced by steel rails. When iron rails were in vogue the demand was more evenly kept up, seeing that fresh orders were constantly being placed out, or the old rails were sent to be re-rolled. Now-a-days the thing is essentially different. Engineers lay down lines of double headed Bessemer rails which they expect to last, with very little trouble to the permanent way men, for a good many years. The first sets of these steel rails have, therefore, not yet worn out (in any quantity worth naming), and, as a natural sequence, the manufacturers who made heavy profits at the outset, and now have nothing to do, must apply an old maxim, and "spread" it over the whole period.

SCOTCH PIG IRON.

The Glasgow warrant market opened quietly on Monday and remained so for the first three days of last week, *albeit* it cannot be said that the quietude was attended with any notable declension of values in respect of the general brands of makers' iron. On Thursday warrants "got up" a little, and by Friday night 61/3 to 61/6 was recorded. On the corresponding date of last year, warrants were quoted at 86/6 to 86/10. The number of furnaces now in blast in Scotland is 114, or six fewer than at the same period of 1874. Freights are unchanged, on the basis of 2/6, Glasgow to New York, either by steamers or sailing vessels. Ballast pig iron is selling at about 47/6 per ton. It will be noticed that last week's shipments were 10,633 tons, an increase of 1615 tons over same week of last year. Of last week's total 7656 were foreign, and 3007 tons coastwise. It is worth bearing in mind that at this date Connal's stores contain 67,735 tons.

Writing from Glasgow on November 19 (night), Messrs. James Watson & Co. said: "The market opened this week at 60/3, and remained steady until Wednesday; since then the price of warrants has advanced to 61/3, cash, and closes buyers thereat; sellers, 61/6. Shipments last week were 10,663 tons, against 9048 tons in the corresponding week of 1874."

	No. 1.	No. 3.
G. M. B., at Glasgow	63/	61/6
Gartsherrie, "	73/	64/6
Coltness, "	77/6	65/6
Summerlee, "	70/6	63/
Langloan, "	73/	63/6
Carnbroe, "	66/6	63/
Calder, at Port Dundas	74/	63/
Glengarnock, at Ardrossan	69/	63/6
Eglinton, "	63/	62/6
Dalmellington, "	63/	62/6
Shotts, at Leith	73/	65/6
Kinneil at Boness	64/6	61/6

Messrs. Wm. Colvin & Co., Glasgow, Nov. 23, say: "The warrant market continued dull until Thursday last, when a slight improvement set in, which was maintained on Friday, when the closing price was 61/3. On Monday forenoon, the opening price was 61/6, but a smart reaction took place, and business was done down to 61/, closing sellers. To-day the opening price was 61/, one month, and a large business was done from that price up to 61/4½, cash, and 61/6, one month, closing with buyers at 61/3, cash, and 61/6, one month. The prices of iron in makers' hands remain steady and, considering the season, there is a fair demand."

	Deliverable alongside. No. 1.	No. 3.
G. M. B., at Glasgow	62/6	61/
Gartsherrie "	73/	65/
Coltness, "	77/6	66/
Summerlee, "	70/	62/6
Langloan, "	73/	63/
Carnbroe, "	66/6	62/6
Monkland "	62/6	61/
Clyde "	64/	62/
Govan, at Broomielaw	64/	63/
Calder, at Port Dundas	75/	64/
Glengarnock, at Ardrossan	69/	64/
Eglinton, "	63/	62/
Dalmellington, "	63/	62/
Carron, at Grangemouth	63/6	..
Carron, " specially selected	67/6	..
Shotts, at Leith	72/6	62/6
Kinneil, at Bo'ness	64/	61/
Bar Iron	£8. 0/ to £8. 10/	
Nail Rods	£9. 0/.	

SHIPMENTS.

	Tons.
Week ending Nov. 21, 1874	13,700
" Nov. 20, 1875	10,879
Decrease	2,821
Total Increase for 1875	83,382

Messrs. John E. Swan & Brother's (limited) prices current, Glasgow, Nov. 19:

Glasgow Brands.	Furnaces Blowg. 114	Furnaces Out 30.	Furnaces Built, 154.	Prices. No. 1.	No. 3.	No. 4
Gartsherrie	13	3	16	72/6	65/	64/
Coltness	12	0	12	77/	65/	..
Summerlee	5	1	8	70/	62/	64/
Langloan	6	0	8	73/	63/	..
Govan	4	0	5	62/6	61/	60/
Calder	3	1	7	*74/	64/	64/
Shotts, Bess'mer	2	0	2	80/	..	..
Shotts, Ordinary	3	1	4	72 6	65/	..
Carnbroe	4	2	6	65/	62/	63/6
Wishaw	2	0	3	..	..	..
Monkland	6	0	6	64/6	61/	..
Chapelhall	3	0	3	67/6	..	..
Clyde	5	0	6	63/6	61/	..
Quarter-Clyde	4	0	4	62/6	61/	..

*1. o. b. Glasgow, 1/ per ton, extra.

Glasgow Warrants, 3-5 No. 1; 2-5 No. 3, g. m. b., 61/4½.

WEST COAST BRANDS—*f. o. b. Ardrossan.*

Glengarnock		7	2	9	68 6	63/	63/
Ardeer		4	1	5			
Eglinton	Brand'd Eglint'n	6	2	8			
Lugar		4	0	4	63/	62/	62 6
Muirkirk		3	0	3			
Portland		3	3	6			
Dalmellington		6	2	8	63/	62/	60/

EAST COAST BRANDS—*f. o. b. in the Forth.*

Kinneil	3	1	4	64/	61/	60/
Almond	2	1	3	63/	61/	60/
Carron, Select'd	4	2	6	67/6	..	..
Carron, Ordn'y				62/6	..	..
Lochgelly	0	4	4	..	..	..
Lumphinnans	0	2	2	..	..	..
Bridgeness	0	2	2	..	..	..

TRADES OF SHEFFIELD.

It is to a certain extent reassuring to notice that there is at any rate one large iron and steel manufacturing concern in this locality which is enabled to continue its operations at a profit. I refer to John Brown & Company, Limited, the directors of which, at their meeting, held on Friday last, decided to pay an interim dividend at the rate of 7½ per cent. per annum, less income tax. I should, perhaps, remark that this very respectable dividend can hardly be supposed to have been earned by carrying on the ordinary processes of iron or steel making, seeing that the company is now making hardly any steel rails at all, and has for some time been making little profit in the ordinary departments. The armor plate shops, &c, have, however, been steadily and fully engaged on what is necessarily profitable work, and the two collieries have been worked up to the full average of the district. The blast furnaces of the company, too, have been a source of income not to be despised, the spiegeleisen produced by them having, I understand, met with a ready sale at the Bessemer works in the district. One of these furnaces, I am informed, is about being blown out for repairing purposes.

In business generally, or at any rate that section of the manufacturing industries with which we are chiefly concerned, there has been a mere continuance of the previous quietude. In pig iron the sales have been few, and, with one exception, not of any moment, although prices have a distinct downward tendency at the time of writing. In hematite irons, nevertheless, very little alteration has taken place, a fact which is attempted to be explained by the statement that the Bessemer trade in Lancashire and on the west coast is much better than in this vicinity. Maryport hematite is 72/6 for No. 3; No. 4, 71/; No. 5, m. and w., 71/ to 72/; Bessemer No. 1, 80/; No. 2, 77/; and No. 3, 75/; all less 2½ for prompt cash. Millom Bessemer, No. 1, 89/; No. 2, 77/6; and No. 3, 75/; ordinary, No. 3, 72/6; No. 4, 71/6: No. 5, 71/; mottled, 80/; and white 80/; all per ton, with the same discount for cash as above. These are the nominal current figures but I am given to understand that purchasers of large lots can "shade" them to the extent of 1/6 to 2/ per ton all round. Some of the Bessemer steel works in outlying portions of the district around Sheffield appear to be doing a better business than establishments of a similar class in the town itself. For instance, the Dronfield Steel Works of Messrs. Wilson and Cammell appear to be running on a full day shift in turning out rails, and at the Penistone branch works of Charles Cammell and Co., Limited, about 1000 tons of Bessemer material is said to be produced weekly, 800 tons or thereabouts being converted into rails, and the remainder into forgings, for home use or for export.

These instances, however, appear to be wholly exceptional, and not to be relied upon as any criterion of the actual state of this particular branch of industry. A good deal of Bessemer steel is certainly now being made use of by the cutlery manufacturers and others, but the dullness of every industry prevents the total requirements from being other than small. There is still a very limited demand for almost every description of cast steel. Small lots of shear steel for certain classes of cutlery continue to be sold, and special qualities for tool making purposes are in request. In several sorts of steel Sheffield has a very marked advantage over all its competitors, whether home or foreign, and that is a superiority which results from the ability to roll steel to almost any given section, whether in plates, sheets, bars, or as wire. This cannot well be done elsewhere, or, at all events, cannot be done reliably, so that for the present steel rolling is almost a monopoly enjoyed by Sheffield alone. It is the natural outcome of one trade having been so long conducted in the same town.

In merchant irons there is a very trifling amount of business doing. Most kinds of merchant qualities are stiffer in price, in sympathy with the corresponding movement in South Staffordshire, but up to now I have not heard of any official intimation of higher quotations. Hoops are, perhaps, selling more freely than other kinds at present. Edge tools continue to move off very freely, our best customers being still our antipodean colonies, Australia and New Zealand, the Cape of Good Hope, India and the West Indies. For most of these markets special classes of goods are manufactured by the local firms, and they are selling very well. Files and saws do not appear to be wanted by consumers, as these industries have, for a long time past, been exceedingly sluggish, a remark which has especial application to the file trade. I have from time to time mentioned that some of the Sheffield houses have file cutting machines at work, but I still gather that their performances are not of the highest class, and that, consequently, their use is not being materially extended.

The demand for coal becomes brisker. There is a gradual but determinate tendency toward higher prices, particularly in respect of household qualities. Every few days one or other of the coal owners advances his quotations. The latest of these, to my knowledge, is the new list of the Sheffield Coal Company, which is as follows: Picked branch coal, 14/6; best Birley Silkstone, 13/; picked cubes for the London market, 13/; screened Silkstone nuts, 7/6; screened seconds coal, 9/6; coke breeze, 10/; hard (washed) melting coke, 18/; and unscreened slock, 3/, all per ton of 21 cwt. at the pits near Sheffield. These figures show advances of four pence to one shilling per ton as compared with last month's prices. Staveley Coal Company's principal figures are 15/6 per ton best house coal, and 9/6 for hard cobbles (seconds). The shippers of Goole are said to be a good deal exercised at the probability of Keadby being made the principal shipping port for South Yorkshire coal; but as Goole has not the accommodation for the traffic, and does not appear willing to provide it, the other port seems to be best suited for the purpose.

The cutlery branches are not quite so brisk, although I hear that one or two firms have secured orders for machine-made cutlery for special trading purposes in the East. As I stated last week, "George Wostenholm & Co. (Limited)," is, so far, a great success, there having been ten times the requisite number of applications for shares. Mr. Wostenholm has issued a letter to the disappointed applicants, stating that the whole of the shares have been taken by persons associated with the business. Mr. Wostenholm further states that he himself has been compelled to take considerably less than the half capital he stipulated should be reserved for him.

IRON AND STEEL INSTITUTE.

A supplementary gathering of the members of the Iron and Steel Institute will be held at the rooms of the Council of the Institution of Civil Engineers, 25 Great George street, Westminster, London, at 10 30 a. m., Nov. 25th. Adjourned discussion on Mr. Adamson's paper "On High-Pressure Steam Generally, and its Application to Quadruple Engines;" discussion on Mr. I. Lowthian Bell's paper "On Price's Patent Retort Furnace;" paper by Mr. G. J. Snelus "On Fire Clay and other Refractory Materials;" paper by Mr. William Hackney "On the Manufacture of Anthracite Coke in South Wales;" paper by Mr. C. J. Homer "On the North Staffordshire Co l Field, with the Ironstones contained therein." Suggestions will be submitted to this meeting for introducing such modifications in the rules and regulations as will in future admit of dealing fully with the various subjects that may be brought before each meeting of the Institute. The above mentioned meeting will be regarded as an adjournment of the meeting in Manchester.

BIRMINGHAM AND STAFFORDSHIRE.

The iron trade of the South Staffordshire district generally is in much the same condition as when last reported upon. There is certainly no improvement in the demand, which has been materially checked by the recent tentative advance of 5/ to 10/ per ton in all kinds of common iron, that description of bars being now nominally about £8. 5/ per ton. Marked bars are still £10, and are unchanged at former quotations. Galvanizing roofing sheets are in much better request, and there is a large turnover of strips, tubes, angles, nailrods and special kinds of iron. The majority of the hardware industries remain fairly well employed, particularly such of them as are mostly best engaged in the autumn and winter seasons. Chandeliers, gas fittings, stoves and fancy goods for presents are instances in point of goods which are commonly in request at this time of the year, and are so at the present time; there is also an active inquiry for tin plates, lamps, nails and all sorts of arms and ammunitions. One concern is delivering the Manzer gun at the rate of 2400 per week.

SOUTH WALES.

The iron trade of this district is so dull that there is nothing new to be recorded in connection with it. None of the iron works are producing other than a nominal quantity of rails and bars, but at Dowlais and Ebbw Vale some encouraging trials have been made in reworking steel rails up. There is a project afoot to start a new tin plate works near Merthyr, with a capital of £30,000, with the idea of joining Penydarran Works to the new place. The coal trade is still large, but very unprofitable.

THE METAL MARKETS.

The markets opened nominally and easier on the Monday, the only notable transaction recorded being 50 tons of Straits, at £84. 10/. On Tuesday 40 tons Straits were sold, 10 tons at £84. 10/, 20 at £84 and 5 at £83; 10 tons, September and October, shipment at £85. On Thursday, business in copper was dull, owing to the first half of November charters having been telegraphed at 2000 tons. Tin was lower, but on the Friday was somewhat firmer; 10 tons Straits at £82. 10/, 15 tons at £83, and 10 tons Australian, £82. On Saturday Mr. Sloane Richards, metal broker, of 26 Waterloo street, Birmingham, filed a petition in the local bankruptcy court with liabilities estimated at £100-000, and assets £18,000.

Messrs. Von Dadelszen & North say: "*Copper.*—Very little business reported. Chili bars have declined to £81. 10/, which is the present quotation for g. o. b. The charters for first fortnight of November are telegraphed as 2000 tons. Wallaroo nominally £91; Burra, £89. 10/; English very quiet. *Tin*, from great activity, has relapsed into a state of depression. Buyers have retired, and sellers have come forward freely, the speculative element being still in the ascendant. Business has been reported from £85.10/ down to £82.10/, our nearest quotation for spot parcels being £83. For arrival and forward delivery there are buyers at £83, sellers asking £83. 10/ to £84. Australian has been steady, with business at £83; our closing quotation, however, is £81. 10/. For English, quotations are nominal; £88 for ingots. Tin plates, more doing, and prices rather better. *Lead.*—Little doing; good soft English pig may be quoted £21. 15/ to £22. *Spelter.*—Rather easier to buy; Silesian £24. 15/ to £25. *Quicksilver.*—In good demand, and price again dearer, £10. 10/ per bottle, but the importer is not a free seller."

Messrs. Berger, Spence & Co. report: "*Lead.*—Notwithstanding there has been a moderate demand during the week, prices receded about 5/ per ton, and have still a downward tendency. *Copper.*—Transactions have been on a very limited scale, but there is no change in quotations. *Tin.*—The slight improvement noticed in our last has been maintained, and rates close firm. *Spelter* is decidedly flat, though dealers are disposed to maintain late quotations.'

The *Mining Journal* remarks: "*Copper.*—The market throughout the week has been unmarked by any change. The various descriptions of copper are all equally neglected, and prices remain without alteration. G. o. b. Chili bars are quoted £81. 10/ to £82; Burra, £89. 10/; Wallaroo, £91; English tough, £88 to £89; best select, £90; Strong sheets, £96, and India sheet 4 by 4, £95. Yellow metal 7⅞d. to 8¼d. On the 18th inst. the charters from the West Coast for the first fortnight of November were announced, being 2100 tons—1500 tons bars and ingots, and 600 tons ore and regulus. No change has followed upon the publication of the charters. The market closes very quiet. The stock of Chili and Bolivian produce held at Liverpool and Swansea on the 15th inst. is estimated at 12,559 tons fine, as against 12,435 tons on Oct. 31, and 10,900 tons on Nov. 15, 1874, and 21,100 tons on Nov. 15, 1873 and 1872. Stock of Chili in Havre is reported to be 1450 tons fine. Stock of Chili afloat and chartered for to date, 11,864 tons fine. Stock of foreign copper in London, chiefly Australian, 7707 tons fine. *Lead.*—The market has become slightly firmer during the week, and sellers are confirmed in their judgment that no further occasion exists for conceding anything in price. The amount of business concluded is small, but sufficient to maintain a steady market. Good soft English pig is quoted £21. 17/6 to £22; and soft Spanish, without silver, £21. 5/ to £21. 10/. *Zinc.*—A sale of 120 tons, London rolled, is reported at £29. 5/. *Quicksilver.*—The price at which business has been concluded in this metal has fluctuated during the week between £10. 7/6 from second hands to £10. 12/6, at which a fair amount of business has been done. *Tin.*—The sudden impulse which was imparted to the market upon the expectation that disturbances in Straits might possibly interfere with the importation of Straits tin has subsided as rapidly as it sprang up, and, together with the excitement, prices have receded, and the drop for the week is not less than 3/ per ton. Business in tin is becoming limited, and the transactions of the last day or two have not extended beyond the requirements for immediate consumption. *Tin Plates.*—This metal is very quiet, and at present quotations manufacturers are indifferent about taking orders, as there is but little if any, margin for profit."

The Freight Discrimination Against New York.

The Directors of the Cheap Transportation Association met on Thursday last at their rooms, in this city. The President, Mr. B. P. Baker, was in the chair. The earlier part of the meeting was devoted to the transaction of business of a private character, and the secretary then read a number of letters relating to discriminations in freight rates which, it is claimed, are made by certain railroad companies. After some desultory discussion of the subject, the Chairman of the Committee on Complaints and Grievances read the following report:

MR. PRESIDENT: At the last meeting of this board the Committee on Claims and Grievances reported several instances, illustrative of a large number, to which our attention had been called, where, in shipments made to Western points from Boston and from New York, there was a clear discrimination in rates against this city of at least thirty per cent. During the past few weeks numerous other instances have been reported, showing that the discrimination at present is against us about 100 per cent. We will recite one case that plainly illustrates the practical effect of the condition of things complained of. A Western dealer ordered a quantity of soda ash through a New York broker. The price of the article here was two cents per pound, gold. Freight from New York to destination forty-one cents per hundred. In Boston the article was held at two and one sixteenth cents per pound, gold. Freight from Boston to destination, twenty-one cents per hundred. The 1-16 cent per pound, cost of the article in Boston over the price in New York, amounts to 6¼ cents per hundred; but the freights from Boston being 20 cents per hundred less than from New York, there was a difference of 13¾ cents per hundred in favor of making the purchase in Boston. This difference of itself was a handsome profit, and it is unnecessary to add the soda ash was bought in Boston, although the price of the article was less here. In this instance, and in the instances referred to in our last report, the shipments were made over a railroad that owes its existence to franchises obtained from this State, and which is universally recognized as a New York road. Our attention has also been called to stationery used by Boston merchants in their correspondence, on which appears the following conspicuous card: "Wholesale Merchants Take Notice—Freight from Boston to Southern and Western points is usually less than from New York." The relative interests of the corporations on which we are dependent for railway transportation to the West, as set forth in our last report, place this community in a position where, in our opinion, it will ever be liable to such discriminations in freight rates as those alluded to, at least so long as we continue to be dependent on these corporations. It has been said that the Baltimore and Ohio Road is operated in the interest of Baltimore. It doubtless is so operated, just so far as that plan of operation serves the interests of the Baltimore and Ohio corporation and its managers, but no further. It is true that the interests of that corporation and of the city of Baltimore are more closely allied than are the interests of any other trunk line with this or any other seaboard city. But we find since the Baltimore and Ohio Company has come to an understanding with the other trunk lines in regard to rates out of New York and other points included in the combination, that company is receiving freights at Boston, transporting by sea to Baltimore, and from thence over their road to the West, at less than their rates from Baltimore to the same points. This action of the Baltimore and Ohio Company is on a par with the Pennsylvania and Erie Companies, who will bill from Boston at less rates than from New York, and stand the arbitrary charges from Boston to and through this city. These anomalies of the trunk lines arise from the fact that the New York Central Road cannot, or assumes that it cannot, consistently make its rates out of Boston conform to its rates out of New York. We would respectfully suggest to the Committee on Railway Transportation that facts such as we have herein briefly mentioned, point unmistakably to a danger which threatens not only New York, but every city and State in the Union, should our transportation system continue much longer absolutely under corporate control. Unless there shall be provided some measure, broad and national in character, which shall regulate and harmonize conflicting elements, and make the interest of commerce paramount to the interests of corporations or individuals, we may expect to see the commerce of the country, sooner or later, bear the same relation to the commerce of other countries as a guerrilla warfare bears to the movements of a well disciplined army. Your committee is doing all in its power to devise means for temporary relief in the matter which forms the subject of this report, and is now in communication with proper parties to that end.

A letter, a copy of which we append to this report, has been addressed by prominent merchants to leading houses in different branches of trade, calling a meeting to-morrow at the Chamber of Commerce to consider the subject. Respectfully submitted.

(Signed), John H. Kemp, W. H. Wiley, Geo. Brown, James S. Barron, Benjamin Lichtenstein, Theodore F. Lees, Committee.

NEW YORK, Dec. 6, 1875.

DEAR SIRS:—The course adopted by the freight lines out of New York within the past few years has been so antagonistic to the general commercial interests of our city, and so injurious to many of the leading branches of trade centered here, to the great special advantage of neighboring competing points, that, unless New York merchants take some prompt and definite action to protect themselves and the future welfare of the metropolis, both must suffer seriously.

The combination rates west from New York for the present winter have been arranged on a basis, to many important points, of nearly one hundred per cent. in favor of Boston, and always largely in favor of Baltimore and Philadelphia, mostly over the same roads. It has been proposed, for the sake of some immediate expression of the widespread dissatisfaction felt here on this account, that one leading house from each class of trade directly affected by this injustice should be asked to prepare a short condensed statement of the relation New York bears to other cities on this question at the present time, so far as their line of goods is considered, and to be represented with such statement at a meeting to be held at the rooms of the Chamber of Commerce on Wednesday next, the 8th instant, at 2 o'clock p. m., to consider the facts and take such early steps as will best secure satisfactory relief. May we ask your hearty co-operation, and, through you, that of the branch of trade you represent. We herewith submit our statement as follows:

On Tin Plates, Pig and Bar Tin and Lead, Special, Per One Hundred Pounds.

To	From New York	From Boston	From Baltimore.
Chicago	35	16	30
St Louis	49	23	42
Cincinnati	32	..	24
Dubuque	64	34	60
Louisville	44	..	35
Cleveland	23	..	19
Toledo	27	..	22
New Albany	41	21	..
Indianapolis	33	..	27

So far as we can learn, the discrimination on other classes of goods is even greater than on ours. Very respectfully,

PHELPS, DODGE & CO.

The report was adopted, and the meeting adjourned.

Ships of the Olden Time.

From the earliest period known of human existence, the desire of floating on the water, as a mode of locomotion or conveyance, has been shown, and what was originally a passion developed into an art. The grander results in the present age will not here occupy our attention; there is enough in the retrospect of this subject to satisfy the liveliest imagination or the greatest thirst for facts. It is patent to all students that the traditions of the earliest times of almost all nations, chiefly embodied in their poems or sagas, refer to a large vessel, in which either the former inhabitants of that country were saved from the destruction of a great flood, or the vessel brought a deity to teach arts and laws to the infant race. So ingrained in the minds of the nations were these arkite legends that the figure of a boat, or ark, became a religious symbol among the Hindus, Chaldeans, Ethiopians, Egyptians, and many other nations, and representations of the ark can now be seen on the oldest ruined temples. Whether this belief arose from a deluge of water, general of local, having occured in the earliest times of our race, it is not our intention at present to inquire; the fact of the existence of the widespread legend cannot be disproved, whatever significance it may possess. An inquiry into the earliest mode of navigation must be useful—if in no other way—should it enable us better to trace the gradual development of human intelligence and contrivance, and the energy shown in combating obstacles as they gradually presented themselves. As long as the rudest boats served the purpose of an imperfect civilization, such forms were retained without improvement, but they yielded gradually to better models and plans as the state of society advanced, and have culminated in the present state of marine architecture.

The ships of the ancients carried out ideas of construction very different from those of this day, and their rate of sailing was, for the most part, slower than that of present sailing vessels; the rate, however varied, and will be found to have been quite respectable at certain periods of the Roman Empire. The earliest vessels were of simple design, and had neither strength nor durability, beauty nor ornament; they consisted of nothing more than single planks laid together, just sufficiently united to keep out the water, and were, in some places, trunks of trees hollowed out, forming vessels of one piece of timber. Other materials beside wood were also employed, among which may be mentioned the Egptian papyrus, and more especially the hides of different animals—of which latter the primitive vessels were frequently made. These were sometimes strengthened by an inside frame of wickerwork, and boats of this description are often used at present on the rivers of Egypt, Ethiopia and Sabæan Arabia. The Indian birch bark and log canoes, of the Western United States, and the skin canoes of the Esquimaux, are as much used now, in proportion to the number of aboriginies, as they ever were.

In early periods, however, when vessels of this light kind of construction were employed, we find no mention of anything but leather, or hides sewed together. It was in a ship of this description that Darnanus secured his flight from Samothracia to the country afterward called Troas; and Charon's boat was also, according to Virgil, constructed of the same material.* On their first invention, all ships, for whatever purpose they might have been designed, appear to have been of the same form; but the various ends of navigation—some of which were better answered by one form, some by another—soon gave occasion for a distinction, not only in point of size, but also in the mode of construction and equipment.

Without attempting to enumerate every trifling alteration, we may state generally, that the vessels of the ancients were divided into three classes—ships of burden, of war, and of passage; and these, again, had their several distinctions into other classes and sub-divisions.

Ships of burden were usually of an orbicular form, having large and capacious hulls for the convenience of stowage, whereas ships of war were of greater length, in proportion to their width and size, as we find to be the case at the present day. Transport vessels were of a form between the ships of war and of burden, being more capacious than the former, and longer than the last mentioned vessels. There was at

* Gemuit sub pondere cymba sutilis, et multam accepit rimosa paludem.—*Eneid*, vi, 414.

the same time a difference in the management of the vessels enumerated. Ships of war, although not entirely destitute of sails, were chiefly managed with oars, that they might be more able to tack and manœuvre in light or contrary winds, and to lay themselves alongside the enemy to advantage; while the other two kinds were mainly governed by sails, and vessels of transport were towed, when it was practicable, with ropes. All three modes of government (by sail, oar and tow-rope) were, however, occasionally adopted by each of the classes. The rowers were not placed, as some have imagined, upon the same level in different parts of the ship, nor perpendicularly above each other's heads; but their seats being firmly fixed, one at the back of another, ascending gradually in the manner of stairs. The most usual number of these banks was three, four and five, composing what are called trireme, quadrireme and quinquireme galleys; the second of these having a range of oars more than the first, and the third a range more than the second—the height of the vessel always increasing in proportion to the number of ranges.

In primitive times the long ships had only one bank of oars, which might be 50 ored or 100 ored. The ship Argo, built by order of Jason, was rowed with 50 oars, and, according to some writers, was the first of the long ships; all vessels, up to that time, having been of a form much more inclining to oval. Others refer the invention of long ships to a much earlier date, averring that Danaus sailed from Egypt to Greece in a ship of 50 oars. Even if Jason be allowed to have been the first who introduced the long ships into Greece, neither he nor his builder, Argus, can be considered as the original inventor of them, but rather as an imitator of the Egyptain or African model—the latter having been constructed some time before by Atlas, and much adopted in that part of the Mediterranean.

The first who used a double bank of oars were the Erythræans, and Aminocles, of Corinth, added a third—as Heroditus, Thucydides and Diodorus have reported—although Clemens Alexandrinus attributes this invention to the Sidonians. A fourth bank was added by a Carthaginian called Aristotle and Nesicthon, of Salanus (according to Pliny), or Dionysius, the Sicilian (according to Diodorus), increased the number to five. Xenagoras, of Syracuse, added a sixth, and Nesigiton increased the number to ten. Alexander the Great and Ptolemy Sotor had vessels of twelve and fifteen banks of oars, and Philip, the father of Perseus, is said to have had one of sixteen banks. As the method of erecting one tier above another became generally known, it was easy to make further additions. Demetrius, the son of Antigonus, built a ship of thirty banks, and Ptolemy Philopator, that he might excel his predecessors, enlarged the number still further to forty, which, as all other parts were necessarily in proportion, raised the vessel to such an enormous size that it appeared at a distance like a floating mountain or island, and on a nearer view took the form of a huge castle in the midst of the waves. This enormous structure contained 4000 rowers, 400 sailors employed in other services, and a body of nearly 3000 soldiers! But this, and such like fabrics, served only for show and ostentation, being, by their great bulk, unwieldly and unfit for ordinary use. Athanæus has informed us that these vessels were commonly known by the name of Cyclades and Ætna, an island and mountain to which they appeared almost equal in size; such ships consisting, as some report, of materials sufficient for the construction of at least fifty triremes.

Beside those already mentioned, there were other vessels fitted with half-banks of oars, which seem to have been between a unireme and a bireme, and consisting of a bank and a half; also, some between a bireme and a trireme, having two and a half banks of oars. These, although perhaps built in other respects after the model of the long ships of war, are seldom comprehended under that description, and are sometimes mentioned in opposition to it.

Several other kinds of ships varying from those here described, are enumerated by different authors, each kind being fitted for some particular use, or special sea service, or employed upon urgent occasions in naval fights, but more commonly as tenders and victualling ships for supplying the principal fleet. Some were built for expedition, to carry expresses, or to observe the enemy's motions without incurring the danger of being overtaken by the heavier and armed vessels, and were distinguished from the regular ships of war by their construction and equipment, resembling the last named vessels in part, and in part ships of burden—while in some respects they differed from both, as the exigencies for which they were fitted might seem to require.

Every ship in later times had several masts, but we are informed by Aristotle that at first there was only one, which was fixed in the middle of the ship. On landing, the mast was taken down, as appears everywhere in Homer, and placed on something, which, according to Suidas, was a case wherein the mast was deposited; but Eustathius will have it to be nothing more than a piece of wood, against which the mast was reared. About the upper part of the mast, when in place on the vessel, there was constructed a kind of turret for soldiers to stand upon and cast darts.

Sails are by some thought to have been invented by Dædalus, and to have given rise to the fable of his using wings; others refer this invention to Icarus, making Dædalus the contriver of masts and yards. There was originally only one sail on a ship, but afterward a greater number was found convenient; and they were usually of linen, but sometimes of any other pliable material, suitable for receiving and repelling the wind. We occasionally find mention of leathern sails, and it was usual with the ancients, when no other appliances were at hand, to hang up their flowing garments for this purpose—whence arose the fable of Hercules having sailed with the *back of a lion*, because he used no other sail than his garment, which was a lion's skin.

Occasionally the ropes and rigging were composed principally of leathern tongs; afterward cordage of hemp and flax came into use, as well as that of broom, palm leaves, philyry and the bark of trees, such as cherry, maple, the vine, etc. The oars were usually covered with brass in the blade, or broad part, to make them stronger. The oars of the lowest bank were shorter than the rest, and those of the uppermost ranges were necessarily the longest, their rowlocks being at the greatest distance from the water; and for this reason it was customary to load their handles with lead, to counterbalance the weight of the lower portion. The rowlocks and the seats of the rowers were generally covered with hides.

The most ancient anchors are said to have been of stone, and occasionally of wood, to which a quantity of lead was attached. In some cases, baskets full of stones and sacks filled with sand, were employed for this purpose. In later times they were composed of iron, and furnished with teeth (arms), whence *odontes* and *dentes* are frequently used for the anchors themselves in the Greek and Latin poets. Originally there was only one tooth, but a second was added by Eupalamus, or by Anacharsis, the Scythian philosopher. The Scholiast on Apollonius confidently asserts that this species of anchor was used by the Argonauts; but herein he (the Scholiast) appears to deserve no great credit, for his assertion is contrary to the testimony of other writers; and his own author, Apollonius, makes mention of none but those of stone. The anchors with two teeth appear, from ancient monuments, to have been much the same as those which are used at the present day, except that the transverse piece, or anchor-stock, is wanting in all of those representations. Every ship had several anchors, one of which surpassed all the others in size and strength, and was never used but in cases of extreme danger, for which reason it was metaphorically applied to those forced to their last refuge. The instrument which answered to the lead of modern days was also composed of lead or brass, and lowered by a chain instead of a line.

Cables were sometimes called *camili* or *cameli*, whence, in the passage in St. Matthew, where the Saviour remarks that "it is easier for a camel to pass through the eye of a needle, than for a rich man to enter into the kingdom of Heaven," Theophylactus and some others have interpreted the word *camelus*, not as meaning the animal, but the cable so called.

With regard to the equipment of the vessels of the ancients, we are told by Thucydides that there was originally no distinction of rank among the crews, but that the same persons were employed indiscriminately in the duties. But as the arts of navigation and naval warfare improved, it was found that one occupation was enough to engross the whole time and application of the person employed therein; and it then became customary to furnish ships of war with three distinct orders of men, viz., rowers, mariners and soldiers. The rowers were divided into three classes—those of the upper, the middle and the lower ranges. Each person had a separate oar, for, except in case of necessity, one oar was never managed by more than one person. The labor and pay of the several classes of rowers were not equal; those who were stationed in the uppermost banks, by reason of their distance from the water, and the consequent length of their oars, underwent more toil than those in the inferior banks, and their pay was, on that account, greater. The crew took their rest upon the deck, or upon the seats where they rowed, and the officers only, or persons of more than ordinary rank on board, were permitted to have clothes spread under them. Thus Homer says:

"But clothes the men for great Ulysses spread,
And placed an easy pillow for his head;
On these he undisturb'd, securely slept,
Lying upon the *stern*."

The class termed mariners were exempt from drudging at the oar, but performed all the other nautical duties of the ship; and, in order that everything might be carried on without tumult or confusion, each had his peculiar office, as appears from the Argonautics of Apollonius and Flaccus. We there find one employed in rearing the mast, another in fitting the yards, a third in hoisting the sails, and the rest employed fore and aft in the ship, each in his proper place. Hence they had different titles to distinguish them, taken from the parts of the ship where they were stationed, and the offices which they were in the habit of performing. There was a class of men inferior to the rest of the crew, which were not confined to any particular station or duty, but were ready on all occasions to attend the other seamen, and supply them with whatever they wanted. The whole ship's crew were usually wicked and profligate fellows, without any sense of religion or humanity, and therefore reckoned by Juvenal among the vilest of rogues.*

The soldiers employed on shipboard, having to fight in hand-to-hand encounters, were more heavily armed in general than those in the army. There were also some warlike implements used at sea, which were never employed on land, the principal of which were spears of an unusual length, sometimes exceeding twenty cubits; instruments of iron, crooked like a sickle, and fixed on the top of a long pole, wherewith they cut in sunder the cords of the sail-yards, which, letting the sails fall down, disabled the light ships. Not unlike this was another instrument, armed at the end with a broad iron head, edged on both sides, for cutting the rudder-cords of ships. There were also engines to cast stones into the enemy's vessels, and another engine is mentioned by Vegetius, which hung upon the mainmast, and resembled a battering-ram. Beside these, there were grappling irons, which were cast out of an engine into the vessels of the enemy. These are said to have been first used in Greece by Pericles, the Athenian, and at Rome by Duilius.

With regard to the naval officers employed by the ancients, we find that in all fleets there were two superior to the rest; one took command of the vessels and seamen—the other, of the soldiers; but the latter had also some power over the ship masters and their crews. The commission of admiral varied according to the exigencies of the times and circumstances, being sometimes held by one alone, sometimes in conjunction with others. Of the latter arrangement, Alcibiades, Nicias and Lamarchus are examples, who were sent, with equal power, to command the Athenian fleet in Sicily. The period of command was also limited by the Grecian people, and shortened or prolonged as they pleased. We read of Epaminondas, that, finding his country would be exposed to great danger upon the resignation of his office, he held it four months longer than he was commissioned to do, during which time he put a new face upon the affairs of the Thebans, and by his skillful management dispelled the fears under which they labored. This done, he voluntarily laid down his power, but had no sooner relinquished it than he was called to account for having held it so long, and narrowly escaped being punished with death, because his action was deemed a precedent dangerous to the commonwealth.

Next in rank to these were what may be termed vice-admirals, who acted under the admirals. The captains of vessels took their names from the rate of the ships they commanded, and each had charge of the helm as well as of the ship, and sat at the stern to steer. They were obliged, at the same time, to be accomplished pilots, and familiar with all the harbors, rocks, quicksands, etc., which were likely to be encountered on the voyage.

The labor of the rowers, which must have been excessive, was cheered by a musician, appointed for the purpose, who contributed, by his voice and instrument, to make the rowers keep time and pull together. The heavenly bodies were observed by sailors on a twofold account—for prognosticating the weather, and as guides to their course. Among the chief stars observed in foretelling the weather were Arcturus, Arae, Orian, Hyades, Hædi, Castor and Pollux, and Helena. It was likewise customary to notice various omens offered by sea fowl, fish and divers other things, such as the murmuring of the floods, the shaking and buzzing noise of trees in the neighboring woods, the dashing of the billows against the shore, and many more—in all which good pilots were well skilled. As to the direction in their voyage, the first historic practitioners in the art of navigation being unacquainted with the other celestial motions, steered during the day by the course of the sun, either making a safe harbor at night, or fastening the vessel to the shore; and then they would leave the boat and sleep on land. Afterward the Phœnicians, whom some assert to have been the first navigators, discovered the motion of other stars. We find the Phœnicians sailed by observing Cynosura, or the Lesser Bear—first observed, in the opinion of some, by Thales, the Milesian—while the mariners of Greece, as well as those of other nations, steered by the Greater Bear, called Helice. For the first observation of this they were indebted to Nauplius, if we may believe Theon: or, according to the report of Flaccus (Argonaut I), to Tiphys, the pilot of the celebrated Argo. But, of these two constellations, we are informed by Theon, the former was the securer guide, and therefore was followed by the Phœnicians, whose skill in marine affairs excelled all the rest of the world, even the Grecians.

* Invenies aliquo cum percussore jacentem,
Permixtum nautis aut furibus aut fugitivis.
—*Juv. Sat. viii.*

BUSINESS ITEMS.

MAINE.

The mills on the Machias River, have closed for the year.

The wages of the employes of the Pembroke Iron Company have been reduced from 10 to 20 per cent., with prospects of a steady run this winter.

VERMONT.

An active business is reported at the works of the Emerson Edge Tool Company, Taftsville. Quite a business is done in the manufacture of what are called Virginia knives and ledgers, amounting to some thousands in number in the course of the year, all for a firm in Richmond, Va., who manufacture the machines in which they are used.

The Rutland Manufacturing Company are shipping chairs to Cape Town, Africa, and to San Francisco.

MASSACHUSETTS.

In speaking of the iron company at Richmond, the *Commercial Bulletin* says: They have discharged their wood choppers, and will close their works as soon as the charcoal and wood on hand are used. The furnace at Cheshire will blow out about January 1st, but that at Richmond will run till spring. The company have some 8000 tons of manufactured stock in store. Their product is about 640 tons a month. They give employment to about a third of the inhabitants of Richmond.

The Worcester Boiler Works have the contract for building six large boilers for the State lunatic asylum, three of which they have already completed, and the remaining three are nearly finished.

At Brockton, several of the leading business men have for some time been considering the feasibility of forming a company for the manufacture of machinery, with a capital of from $300,000 to $400,000.

King & Hutchinson, who recently opened a manufactory in the brick building adjoining the cotton factory, at Athol, have already secured a large number of orders for their new sash balance and sash and door lock. They have facilities for turning out twenty gross per day.

H. S. Mansfield's Scythe Works, Millville, have commenced work again.

The Fay Emery Company, Chester, have stopped work until the trade is better.

Morse Brothers, stove polish manufacturers, of Canton, have shut down for a few weeks. They have given notice that married men while idle will receive $3 per week; single men, $2 per week, and girls, $2 per week.

CONNECTICUT.

Sherman R. Warner, 186 State street, New Haven, makes a specialty of superior steam pipe for heating factories and buildings. This house has now been running for 30 years, though under the present style for only three years. A large business is done, not only in New Haven and surrounding towns, but large orders are continually being received from New York State. The tin heating pipe put up in this factory is said to possess many advantages over the 1 inch iron pipe, as the steam flows through the tin pipe more readily than through the iron pipes, thus making a large saving of steam.

The New Haven Steam Heating Company, manufacturers of steam heating apparatus, have been established as a company for 10 years, but the goods have been made for 21 years in New Haven. The company employ 25 hands, and have a capacity for turning out 300 radiators per month. The main factory building is 53x107 feet and three stories high, with a basement and L, the latter being 60x20 feet. Steam-power is furnished by an engine of 20-horse and a boiler of 40-horse. The iron used is all rolled in Philadelphia. Of the radiators made by this concern over 50,000 are now in use, 300 being in New Haven. S. E. Merwin, Jr., is president of the company, and C. L. Hubbard secretary and general superintendent.

Lowe & Watson, Bridgeport, have recently completed a boiler of 50 horse-power, which is made entirely of homogeneous steel plates, and is calculated to be worked under a pressure of 150 pounds. They will duplicate this boiler for exhibition at the Centennial.

The manufacture of cartridges for the Gatling gun is soon to be commenced at the Cartridge Company's works in Bridgeport.

The control of all the patents pertaining to the manufacture of differential pulleys has been obtained by the Yale Lock Manufacturing Company, Stamford. Their factory has begun to run on 9 hours' time.

Another large addition to the manufactory of the Glove Company, Naugatuck, is being built.

NEW YORK.

On the 15th ult., the Seneca Falls Pump and Fire Engine Works, of Rumsey & Co., of Seneca Falls, received 400 tons of pig iron to be used in their business. Its value was $10,000. It will be used for the manufacture of pumps, garden engines and similar hydraulic machines.

A new mowing machine company has been organized at Glen's Falls. Fifty thousand dollars have been subscribed, and plans for beginning the works will be speedily perfected. The originators promise to employ several hundred men all the year round.

Owing to a defect in the lining one of the stacks of the Crown Point Iron Company is to be put out of blast. This furnace has been making Bessemer iron.

There are good prospects of work for the iron manufactories at Troy all winter. It is rumored that the managers of both the companies have received orders from the builders of the great bridge at New York.

Corning & Co., Troy, will place a new horse shoe machine in their water mill shortly.

PENNSYLVANIA.

One of the Danville mills has received a heavy order for rails.

The old rolling mill at Bethlehem has suspended operations for want of orders.

The Harrisburg Car Company has received an order for one hundred and fifty cars, and will resume operations at once with a moderate force of hands.

The last two furnaces at the Allentown Rolling Mill are now in blast, and the whole of these extensive works are once more in successful operation.

The Bethlehem Iron Company has begun on an order of the Lehigh Valley Railroad Company for steel rails weighing fifty-eight pounds to the yard. The order will keep the mill busy for some time hence.

A discouraging outlook for laborers in Harrisburg this winter. The Chesapeake nail works have been obliged to reduce wages from $4·50 to $4 per ton. There is nothing doing at the Paxton furnaces, and no prospects for opening the blast this winter. The Lochiel Iron Works have closed.

It is stated that there are about one hundred and forty mines in Schuylkill county, of which the Reading Coal and Iron Company own eighty, and individuals sixty. All, or nearly all, of these mines are reached by railroad, making the coal region a net work of iron rails, and giving the Reading Railroad Company more miles of railroad in these "laterals" than it has in its main road.

The Warwick Iron Company's new furnace, Pottstown, is rapidly approaching completion. The outside work is almost finished, and the engine and machinery are being placed in position. The engine is of five hundred horse-power, the blowing cylinder being eighty-four by ninety-six feet. Forty employes are now engaged at the furnace. It will be ready to blow in on February 1, 1876.

Two locomotives of immense power have recently been erected in the Altoona shops for the specific purpose of assisting freight trains up the eastern slope, from Altoona to Gallatzin. These engines are known among railroad men as "Modocs," and owing to their peculiar construction, as well as immense weight, they can perform the work of almost two ordinary locomotives, as far as power is concerned.

The Charlotte Furnace, of Scottdale, Westmoreland county, has been blown out after a successful run of 25 months. The reasons for so doing were, first, to stop production at the present season of depression, and second to enable the owners to repair the lining. The furnace might have been run for some months longer, but the present time seemed to be the most opportune for making the repairs.

The Pennsylvania Steel Works, Harrisburg, have begun the construction of a second blast furnace, two feet more in diameter than their first, which they expect to have in operation by January 1. With the late improvements made in the Bessemer Rail Mill, and other appendages, they now have a capacity to turn 45,000 tons of steel rails annually.

Painter & Son, proprietors of the foundry at Myerstown, are at present engaged in furnishing the hot blasts for the Mount Hope Furnace. They are also at work on the shafting and pulleys for the new planing mill at Myerstown.

On or about April 1, 1876, the Knauertown, charcoal forge, located in Chester county, will be removed to Douglassville, on the line of the Philadelphia and Reading Railroad.

It is contemplated by the Rock Hill Iron and Coal Company, whose furnaces are located at Orbisonia, Huntingdon county, to blow in about January 1.

The work of erecting the new rolling mill of the Glasgow Iron Company, at Glasgow, Montgomery county, is progressing favorably. The frame work will be put up in a short time.

Ainey's Furnace, Lehigh county, it is reported, will soon resume operations.

All the iron works in Danville, except the old National, are in full operation.

The new fire brick works at Lewiston have gone into operation.

VIRGINIA.

The Bell Isle Works, Richmond, are running to full capacity. The Tredegar has not been doing much the last few months, but prospects are good for the winter.

OHIO.

A firm in Ohio is making gravestones and monuments from zinc.

Messrs. Pratt & Armstrong of Cleveland have recently furnished a steam drill and other mining machinery to be used in the Utah silver mines of a company recently organized in this city.

KANSAS.

The Kansas Rolling Mill Company have leased, put in perfect running order, and started, the Topeka Rolling Mill, at North Topeka, Kansas; have also nearly completed a large mill at Rosedale, Kansas, on the line of the Missouri River, Fort Scott and Gulf Railway, and will be prepared in a few weeks to furnish 150 tons of rails per day. Mr. A. B. Stone, of New York, president of the Cleveland Rolling Mill Company, the Union Rolling Mill Company, of Chicago, the American Bridge Company, and other corporations, is also president of the Kansas Rolling Mill Company. Col. W. H. Harris, of Kansas City, is vice-president and general manager, and Ira Harris, Jr., of Kansas City, is secretary. The general office of the company is located at Kansas City, Mo.—*American Manufacturing Journal.*

INDIANA.

The advance in miners' wages in the block coal regions of Indiana, which took place on the 1st instant, has had the effect of bringing miners to that district from other localities.

MISSOURI.

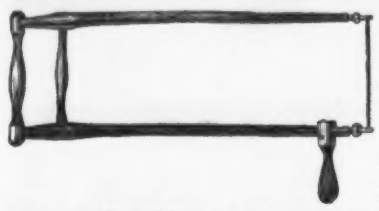
Messrs. Shulte & Gray, of East St. Louis, have purchased the foundry in the southern part of Carondelet, formerly owned by Meierpeter & Lawnin. The works have been thoroughly repaired and put in operation.

Mines, Metals and Arts, of the 25th, says that the St. Louis Bolt and Iron Co.'s works are running the large mill full day turn on fish-plate orders, and double turn on small mill on bar, chain-irons, spikes and bolt rods. The spike and bolt department is full of work. The large mill has a capacity of 32 tons double turn; small mill, 15 tons, 1000 bolts and 150 kegs spikes of various kinds, are the ordinary limit. The mill runs heavily on railway, street railway and boat spikes, etc.

St. Louis papers are rejoicing over the good water in the Ohio River. A consequence of the good condition of the river is a low rate of freight, and goods from Wheeling and Pittsburgh "are coming on in immense quantities." A steamer left St. Louis on the 20th ult. for Pittsburgh with 900 tons of Iron Mountain pig metal.

Rail Rolling Extraordinary.—The important capabilities of the steel works belonging to the Ebbw Vale Company have just been tested, with satisfactory results. A few days ago arrangements were made by Mr. J. J. Richards, the manager, for the rolling of two steel rails of extraordinary length, weight and quality. The first rail brought out was what is called a T head rail, and its length is 74 ft. 6 in., or 24 yards 2 ft. and 6 in.; it weighs 16 cwt. and 6 lb., and a faultless specimen of the class of rail indicated. The second rail, which is most distinguished for size, length and beauty, is what is termed a double-head rail. Its length is 89 ft. 7 in., or 29 yards 2 ft. and 7 in. The weight, calculating 78 lb. per yard, is 1 ton 3 qrs. and 14 lbs.—*Iron and Coal Trades Review.*

O'Brien & Bro., of St. Louis, have a job for the Topeka Rolling Mill. It is a long connecting pipe. Also the cold blast pipes and ladles for the Vulcan Bessemer Steel Works, at Carondelet.



We wish to call the special attention of merchants to this

PATENT

BRACKET SAW FRAME.

We have never before made anything which sold so readily, and gave such universal satisfaction.

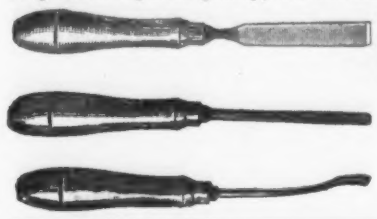
Where one is sold in a neighborhood, it makes a demand for many more. We have now sold 40,000 of them and have not yet heard one complaint, but we have a large number of letters expressing great satisfaction with them. We have advertised them largely and thereby created a demand in every part of the country.

The list price of Rosewood Frames is $1·25 each, and of Birch $1·00 each, with the same discount that we make on our Barber Bit Braces. Price of Saw Blades, $1·20 per gross net.

We also make sets of

CARVING TOOLS.

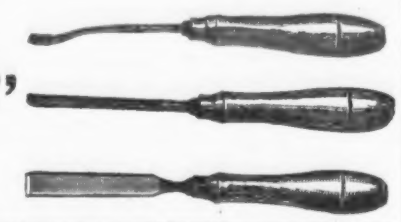
Price of the three tools in nice paper box $1·00, discount 25 per cent. to the trade. These tools are sharpened and fitted for work. They are of superior quality, and sold at a lower price than imported tools.



Millers Falls Co.,

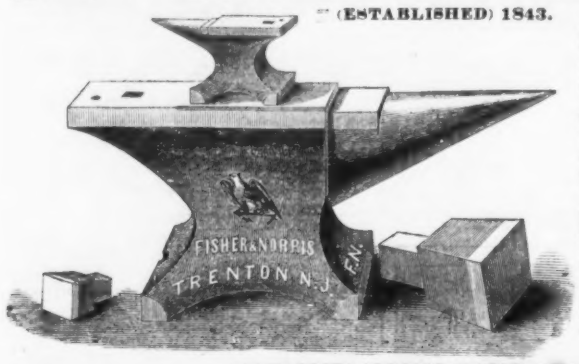
No. 78 Beekman Street,

NEW YORK.



THE EAGLE ANVIL !! WARRANTED !!

(ESTABLISHED) 1843.



These Anvils are *superior* to the best English, or other Anvils, on account of the peculiar process of their manufacture (invented and used only by this concern), and from the quality of the materials employed.

The best English Anvils become hollowing on the face by continued hammering in use, on account of the fibrous nature of the wrought iron—causing it to "settle" under the face.

The body of the Eagle Anvils is of crystallized iron, and no settling can ever occur; the steel face, therefore, remains perfectly true. Also, it has the great advantage, that being of a more *solid* material, and consequently with less rebound, the piece forged receives the full effect of the hammer, instead of a part of it being wasted by the rebound, as of a wrought iron anvil. An equal amount of work can, therefore, be done on this Anvil with a *hammer one-fifth lighter* than that required when using a wrought iron anvil.

The working surface is in *one piece* of JESSUP'S BEST TOOL CAST STEEL, which, being accurately ground, is hardened and given the proper temper for the heaviest work. The *horn* is covered with and its extremity made *entirely of steel*. The body of the Anvil is of the strongest grade of American iron, to which the cast steel face is *warranted to be thoroughly welded and not to come off*.

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Small Anvils, ("Minims.")

No.	00	0	1	2	3	4	5	6	7	8	9
Weighing about	10 lb.	15 lb.	20 lb.	30 lb.	40 lb.	50 lb.	60 lb.	70 lb.	80 lb.	90 lb.	
	$2·50	$3·20	$3·75	$4·50	$5·00	$5·90	$6·75	$7·25	$8·10	$9·00	$9·60

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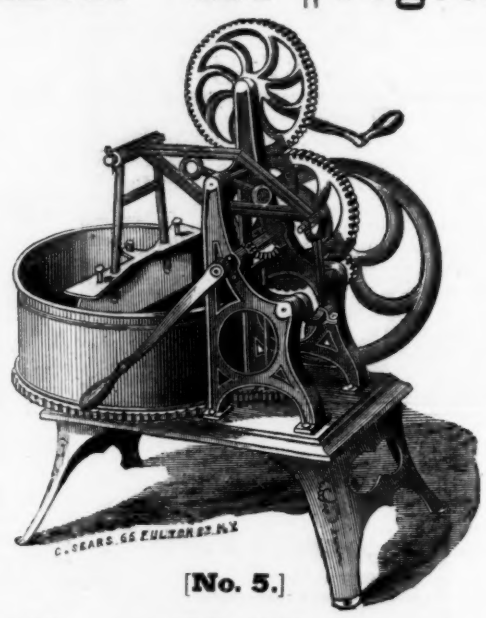
American Meat and Vegetable Choppers.

[No. 1.]



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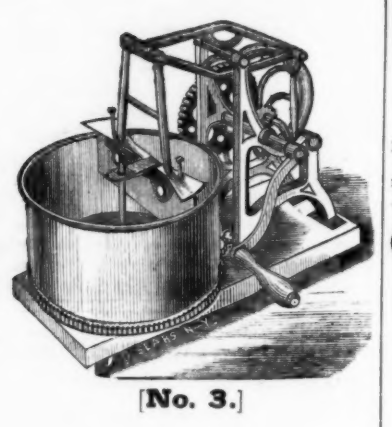

[No. 3.]

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THEY WILL

Do More Work and Require Less Power than any other Chopper yet Invented.

SIZES AND PRICES:

No. 1 , Small Family Size	$ 6 00	No. 2, Large Family Size	$ 9 00
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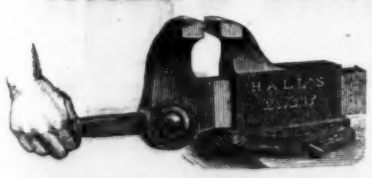
GET THE BEST.

HALL'S Sudden Grip VISE.



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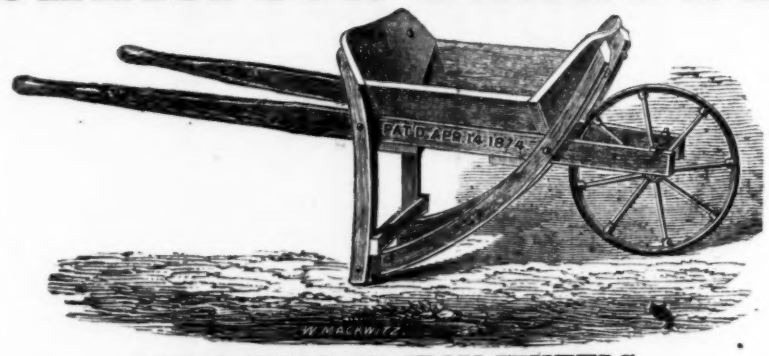

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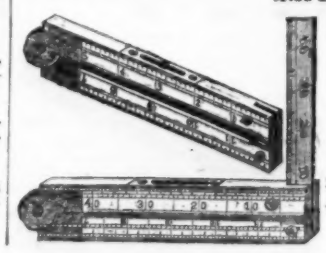

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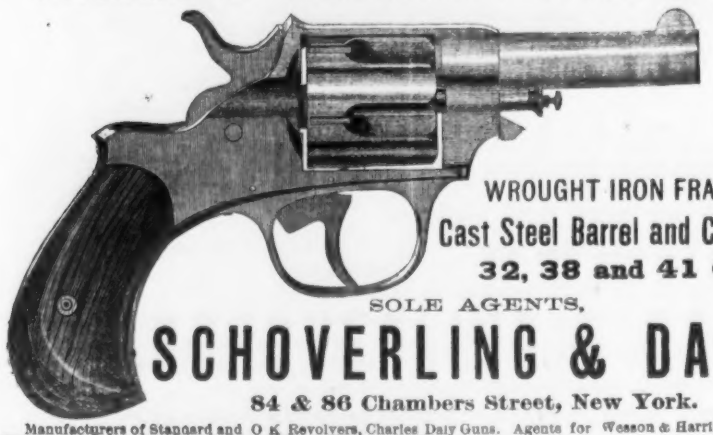

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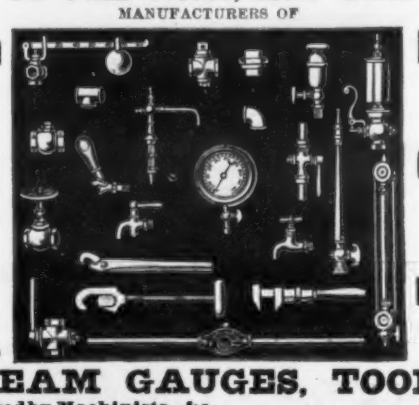

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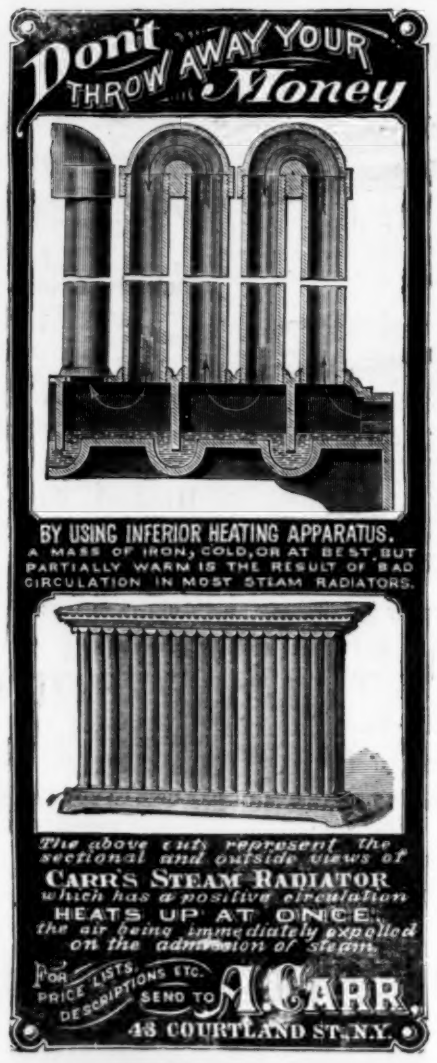

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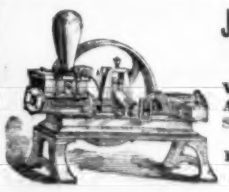

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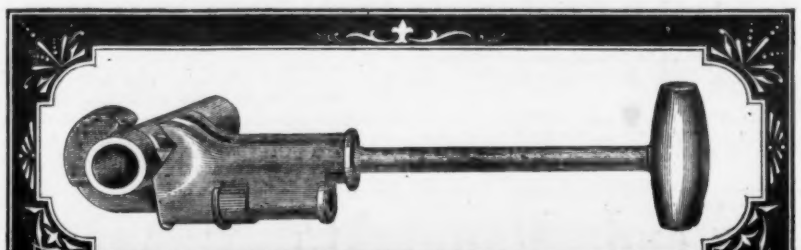

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Cuts Wrought Iron, Brass and Copper Pipes, Round Iron &c perfectly true without leaving burr on pipe, contracting or splitting it. Cuts out a chip similar to a lathe tool. The knife may be removed and ground. Send for descriptive circular to manufacturers.

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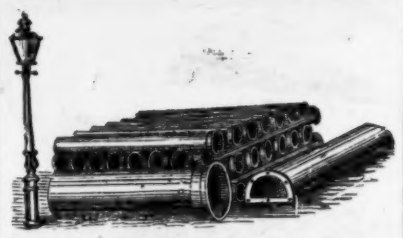

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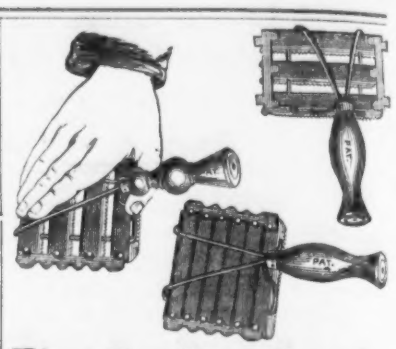

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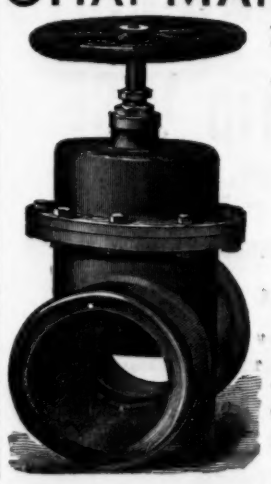

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VALVES.
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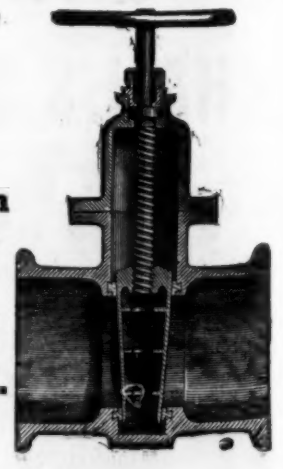

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and Index to Advertisements.

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Pure Nickel, in grain, **Nickel Plates** or **Anodes, Nickel Salts,** double and single, **Rouge,** stick and soft, **Composition, Batteries, Carbon Plates, Zinc Plates, Tripoli, Crocus Emery,** Etc.
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NICKEL PLATING

On all Metals, by Wilder's new Processes, used only by **WILDER & CO.**

PLATING ON ZINC

a specialty. Fitting up and furnishing shops, laboratories, etc. All work done in best manner.
114 Fulton Street, N. Y.
WM. J. WILDER. JAMES RITCHIE.

CONTINENTAL
Nickel Plating Works,

47 ANN ST., Bet. Nassau and William Sts.
ESTABLISHED 1869.

Solutions and Batteries furnished under special improvements of our own, tested and demonstrated by practical experience. Instructions given for its use. Our plating guaranteed not to chip or peel.

J. C. BUCHANAN. G. P. WILLEY.

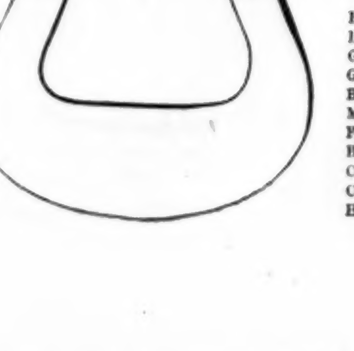
STOVE LID LIFTER.
KETTLE TIPPER.

AMERICAN MFG. CO., 102 Orange Street, New Haven, Conn.
☞ Send for Circulars. See Notice page 9, Nov. 11.

The Cowles Hardware Co.,

UNIONVILLE, CONN., Manufacturers of

HARDWARE & HOUSE-FURNISHING GOODS.



GEO. DUNHAM, Prest.
G. S. KNAPP, Treas.
MARTIN COWLES, Sec.

Screw Drivers of all varieties,	Carpet Stretchers,
Box Scrapers,	Tack Claws,
Box Openers,	Marking Awls,
Garden Hoes,	Carpenters' Awls,
Garden Trowels,	Belt Awls,
Border Knives,	Ice Awls,
Mincing Knives,	Carriage Jacks,
Fish Turners,	Nail Sets,
Butter Knives,	Bush Hooks,
Cake Turners,	Ice Axes,
Cleavers,	Ice Tongs,
Hammers,	Patent Mouse Traps,
	Vegetable Slicers.

PEEKSKILL FIRE BRICK WORKS.
Established 1831.
HORTON & MABIE,
Manufacturers of
Fire Brick of all kinds,
STOVE AND RANGE LININGS
of every description. **Linings for Cupola or Foundry Furnaces. Blocks, Tiles, McKenzie Cupola Brick, &c.**
FIRE CLAYS, FIRE SAND & FIRE CEMENT.

A. HALL & SONS, Perth Amboy, N. J.
ESTABLISHED 1846.
HALL & SONS, Buffalo, N. Y.
ESTABLISHED 1866.
FIRE BRICK
of reliable quality for all purposes, manufactured of the best New Jersey Fire Clays. Also, ROCKINGHAM WARE, YELLOW WARE, Fire Clay, Fire Sand, Kaolin Ground Fire Brick, and Diamantine Building Brick.

HENRY MAURER,
Late of the firm of MAURER & WEBER,
Proprietor of the
Excelsior Fire Brick & Clay Retort Works,
Sole Manufacturer of **French Pat. Roofing Tiles and Hollow Brick.**
WORKS: PERTH AMBOY, NEW JERSEY.
Office & Depot: **418 to 422 East 23d St.,** bet. 1st Ave. and Ave. A, **New York.**

BROOKLYN CLAY RETORT AND Fire-Brick Works,
Van Dyke Street, Brooklyn, N. Y.
E. D. White, Surviving Partner of the late firm of J. K. Brick & Co.

Manhattan Fire Brick & Enameled Clay Retort Works,
ADAM WEBER, - - Proprietor.
Office, **633 E. 15th St., N. Y.** Clay Retorts, Enameled for Gas Houses; Retorts for burning raw bone and re-burning bone for Bone Black. Fire Bricks, Flues, Blocks, Cupola and Range Bricks of all shapes and sizes. The best fire clay from my own Clay Beds at Perth Amboy, N. J.

Brick Presses,

BRICK PRESSES,
For Fire and Red Brick,
PATENT STEAM GEARING
For grinding Clay for Red or Fire Brick, and a kinds of **Brick Machines** in general.
Works, 1819 Germantown Ave., Phila.
GEO. CARNELL.

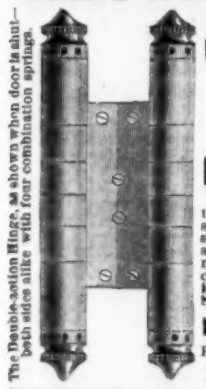
Oldest and Largest Establishment of the kind in the U. S
F. L. & D. R. CARNELL,
1844 Germantown Avenue, Philadelphia
Manufacturers of Pennsylvania Brick Machine Little Giant Pipe Machine, Fire and Red Brick Presses, Clay Wheels, Tile Machines, Stampers, Grinding Pans. Brick Yards fitted out for running by steam or horse. Heavy and Light Castings. Send for circular.

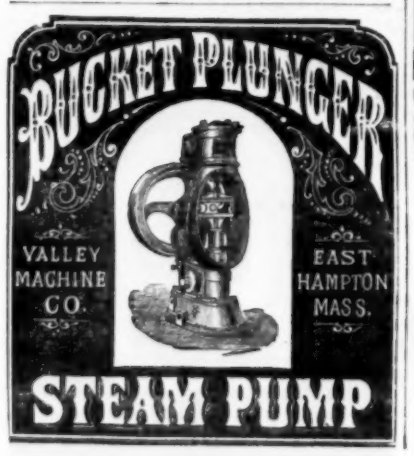
PERSEVERANCE
Iron Works & Machine Shop.
MARCUS SCHANTZ,
Having established himself in the Iron and Machine Business in **Water St., Perth Amboy,** is now prepared to execute all orders in machinery, such as **STEAM ENGINES, BRICK MACHINES, BRICK PRESSES AND TILING MACHINERY.** Also, Steam Fitting, and Iron and Brass Castings, &c., furnished in the shortest time, and in the best and most workmanlike manner.

MILLER'S BRICK PRESSES,
Established, 1844.
Clay Tempering Machines
AND BRICK MAKERS' TOOLS.
Factory, 309 S. 5th Street, Phila. S. P. MILLER

With Disston's Saws. 4 Sizes.

Sold by Hardware Trade.
LANGDON MITRE BOX CO.,
Send for Circular. *Millers Falls, Mass.*

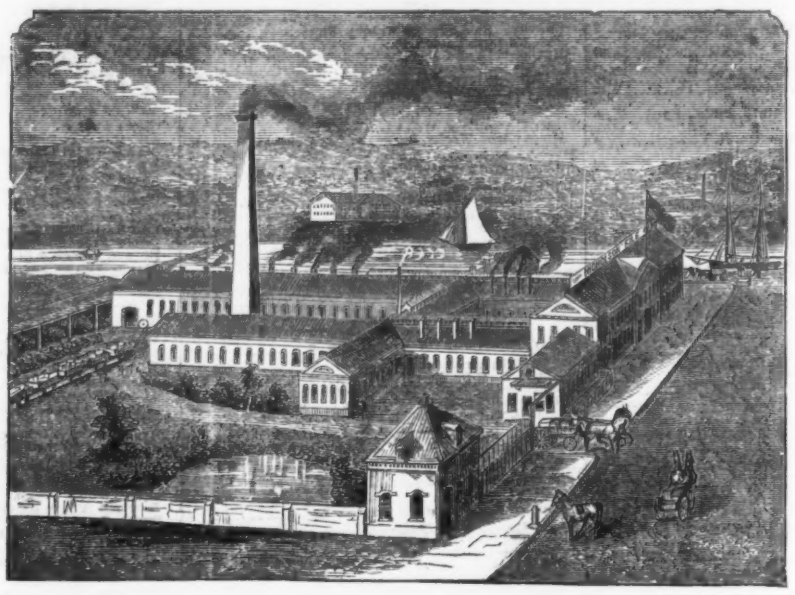
Buy House's Double Action GIANT SPRING HINGE
FOR

The Double-action Hinge, as shown when door is shut—both sides alike with four combination springs.
Banks and Offices,
CHURCHES,
School Houses,
And all
Public Buildings.
It has no equal. It swings the door both ways, forms a solid attachment on each side. Has four combination springs acting together, cannot settle nor sag. **Will carry any weight, and is decidedly the Finest, Strongest, and Best made.**
HOUSE BROS.,
Patentees & Manufacturers,
194 Broadway, N. Y.



STAR FIRE BRICK WORKS.
HARBISON & WALKER,
Manufacturers of Benezet and Clarion Brands of FIRE BRICK.


For steel melting holes, Siemens Gas Furnaces, Bessemer Steel Mills, Hearths and Boshes of Blast Furnaces, Fire Box Arches, &c., &c., our Benezet is unequaled. For Rolling Mills, Foundries, Linings and Hot Blasts of Furnaces, Lime Kilns, &c., our Clarion is unsurpassed.
Office and Works, Twenty-Second & Railroad Streets, Pittsburgh, Pa.

Philadelphia Fire Brick AND Clay Retort Works,
AND KENSINGTON FIRE BRICK WORKS
Office, 23d and Vine, Philadelphia.
PHILIP NEWKUMET,
Successors to **JOHN NEWKUMET,** Proprietor manufactures 9-inch Fire Bricks, Tiles, and Blocks for Rolling Mills, Blast Furnaces, Foundries Gas Works, Lime Kilns, Glass Houses, &c., &c
Articles of every description made to order short notice, and in a very superior manner.
"CLAY RETORTS FOR SUGAR HOUSES."



DEALERS AND CONSUMERS
OF FILES
SHOULD PURCHASE THE

Nicholson or "Increment Cut" File

FOR THE FOLLOWING REASONS:

First.—They are made from the best quality of File Steel.

Second.—Each File undergoes a careful inspection after each operation, by critical inspectors, and none but perfect work allowed to pass.

Third.—They are cut by the **"Increment"** or **irregular cut,** therefore combine the advantages of both Hand and Machine work.

Fourth.—They **will finish finer** than Files of any other make of same degree of coarseness.

Fifth.—They **will not "pin"** or scratch like hand-cut Files.

Sixth.—The **"Increment cut"** File, by our records, **will remove more stock with a given number of pounds applied** than any other File with which we are acquainted

Seventh.—All Files under seven inches are **put up in boxes** of one dozen each, and neatly labeled.

Eighth.—The large stock carried by us, combined with our superior facilities, enables us to fill the largest orders at the shortest possible notice.

Ninth.—We are constantly making careful tests of our Files by delicately constructed machinery, which **automatically records** the **actual power applied,** forward, backward and downward, at each stroke of the File, also the number of strokes, combined with the work performed, enables us not only to judge of the **quality of our Steel for wear,** but **also of the cutting qualities** of the File, and the ease (expressed in pounds) with which a given amount of work can be accomplished.

Finally.—Our Files **are warranted** to be **hard, well cut** and **sound.** They are exclusively used by many of the largest Railroads and Machinists in the country—and the vigorous growth of our reputation, not only for making a good article, but of **our ability to furnish a good article cheap,** is evidenced by the large number of Dealers and Jobbers who are handling our Files exclusively.

NICHOLSON FILE COMPANY, Providence, R. I.

SOLD BY HARDWARE DEALERS GENERALLY.

CROOKE & CO.,
MANUFACTURERS OF
WROUGHT IRON BUTTS,
All our goods are manufactured from patent faced iron plates; they have a smooth face and bright finish.
163 & 165 Mulberry Street, New York.
FERNALD & SISE, Agents, 100 Chambers Street, N. Y.

Burke & Fraser,
SOLICITORS OF
PATENTS
37 PARK ROW, N. Y. CITY.
Established 1851. *Also Consulting Engineers.*

PATENTS. Send for circular.
Thomas D. Stetson, No. 28 Murray St., N. Y. Solicitor of Patents, and Scientific Expert in patent cases.

B. KREISCHER & SON.,
New York Fire Brick & STATEN ISLAND CLAY RETORT WORKS,
Established 1845.
Office, 58 Goerck Street, cor. Delancy Street,
East River, New York.
The largest stock of Fire Brick of all shapes and sizes on hand, and made to order at short notice.
Cupola Brick, for McKenzie Patent, and others. Fire Mortar, Ground Brick, Clay and Sand. Superior Kaolin for Rolling Mills and Foundries. Stone Ware and other Fire Clay and Sand, from my own mines at New Jersey and Staten Island, by the cargo or otherwise.

Watson Fire Brick Manufactory
ESTABLISHED 1836.
JOHN R. WATSON, Perth Amboy, New Jersey.
Manufacturer of
FIRE BRICK,
For Rolling Mills, Blast Furnaces, Foundries, Gas Works, Lime Kilns, Tanneries, Boiler and Grate Setting, Glass Works, &c.
FIRE CLAYS, FIRE SAND, AND KAOLIN FOR SALE.

NEWTON & CO.,
Successors to
PALMER, NEWTON & CO.,
ALBANY, N. Y., Manufacturers of
FIRE BRICK
Stove Linings,
Range and Heater Linings
Cylinder Brick, &c., &c,

M. D. Valentine & Bro
Manufacturers of
FIRE BRICK And Furnace Blocks,
IN ALL ITS BRANCHES.
Woodbridge, - - - N. J.

National Fire Brick & Drain Pipe W'ks,
CHAS. ANNESS & SONS, Props.,
Manufacturers of **FIRE BRICK** all shapes and sizes.
Miners and Shippers of all kinds of **FIRE CLAY.**
Factory at SPA SPRINGS, on Perth Amboy and Woodbridge, R. R.
Post Office address, *Woodbridge, N. J.*

TROY STOVE LINING AND Fire-Brick Works.
BELL & BACON.
Stove Linings a Specialty. **TROY, N. Y.**
JAS. C. BELL, JR. J. BLUNT BACON.

Established 1845.
WOODBRIDGE, N. J.
Fire Brick Works.
WM. H. BERRY & CO.
Manufacturers of all forms and sizes of **FIRE BRICK,** for Blast Furnaces, Rolling Mills, Gas House and Oven Tiles, and Stove Linings, made to order. Also, Fire Clay, Kaolin, Sand and Fire Mortar.

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Counsellors at Law,
229 Broadway, NEW YORK.
Practice in cases relating to
PATENTS and TRADE MARKS.
Before the
Courts and Patent Office.

A. H. SPENCER,
Solicitor of Patents,
And Expert in Patent Cases.
28 State St., Room 19, Boston.

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OFFICES FOR PROCURING
UNITED STATES AND FOREIGN
PATENTS,
Forrest Buildings
119 SOUTH FOURTH ST., PHILADELPHIA,
AND MARBLE BUILDINGS
605 Seventh St. (Opposite U. S. Patent Office, ***Washington, D. C.***
H. HOWSON, Solicitor of Patents. | C. HOWSON, Attorney at Law.
Communications should be addressed to the PRINCIPAL OFFICES, PHILADELPHIA.

FRANCIS C. NYE,
Counsellor at Law,
13 Murray St., N. Y.
PATENT CASES
brought or defended in any district of the U. S.

SOLICITS W. E. SIMONDS, Att'y at (Patent) Law. **PATENTS**
In the U. S. and abroad, with special aim to strength and validity, and in shortest possible time. Pamphlet free. 345 Main St., Hartford, Conn.

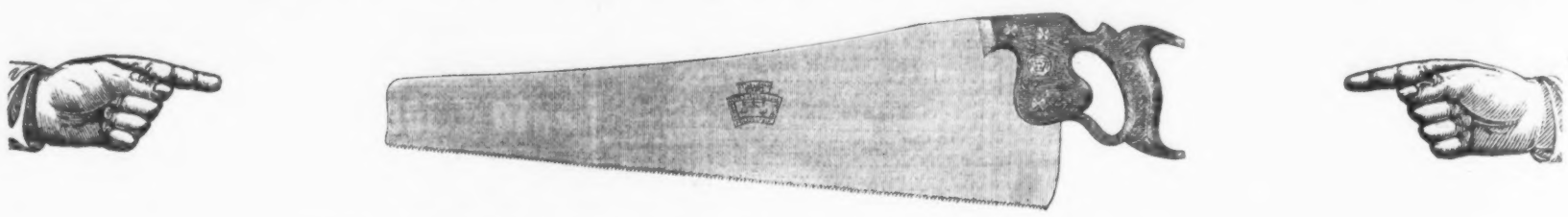
HENRY DISSTON & SONS,

Keystone Saw, Tool, Steel and File Works.

Front and Laurel Streets, Philadelphia.

Henry Disston & Sons New Patent Skew Back Hand Saw

"CENTENNIAL No. 76."

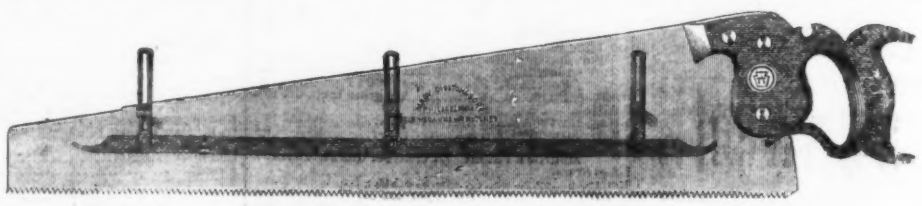


TO THE HARDWARE TRADE.

GENTLEMEN: We are prepared to supply the trade with an entirely new Hand Saw, called the "Centennial No. 76." This Saw is ground on the back, to taper gradually from butt to point, being only 26 gauge at the point. By this mode of grinding, the Saw, when tested, makes a complete "whip bend." The handle is apple-wood, oil finish, the screws are flush and polished, and the Saw is superior to any ever offered to the trade in this or any other country at the price. It is the sweetest-cutting, nicest-hanging Saw that can possibly be manufactured, feeling as light as a feather at the point, owing to its peculiar construction. The screws are finished before being put into the handle, and, should they become loose, can be readily tightened with an ordinary screw-driver, and still make a good finish. It was our intention to keep this Saw from the market until Centennial year; but second thought has decided us to give the trade an opportunity to test it before then, that they may know whether they can put it in stock without risk. The price of this Saw at present will be the same as that of the regular No. 7. It is a "hard times" Saw, and we do not know how long the price can be sustained. Mr. Henry Disston is willing to risk his reputation as a Saw-Maker upon "the Centennial No. 76." Send for samples and put them in the hands of the Carpenters—to be returned if not as represented.

November, 1875.

GAUGE SAWS, "HAND AND BACK."



The accompanying engraving represents our Patent Gauge Saw, which is an invaluable improvement where a fixed and definite depth of cut is required. For Tenoning, Shouldering, Dovetailing, Curving, Cog-Cutting, etc., it is just the tool. We manufacture them in both Hand and Back-Saws. Remove the gauge from the Hand-Saw and it can be used for any of the purposes to which a Hand-Saw is adapted.

HENRY DISSTON & SONS'

Patent Setting Stake

For Setting Web, Jig, Band or any kind of Narrow Saws.

The principal difficulty experienced in setting a narrow Saw arises from the fact that the blade is liable to tilt or slide backward as each successive tooth is struck by the hammer. The back guide with its projecting lip, under which the Saw passes and is securely held during the process, effectually prevents these difficulties and holds the Saw up to its work; thus the operator is enabled to strike the tooth with certainty every time, and prevents any distorting of the saw blade.

The guide can be adjusted to various widths, by inserting or removing packing, as occasion may require. Either edge of the set can be used by reversing the back guide, and as the edges are of different sizes, they are adapted to Saws of different widths. A narrow Saw set by the aid of this Stake remains as straight after as before; a result which cannot be attained by any other means.

DOUBLE HANDLE FRAMING SAW.

The advantages of a Framing Saw with a handle at each end are numerous. It can be used by either one or two men. It is particularly adapted for framing. The handles are so constructed that both hands can be used at either end. The thrust is on a line with the cut, and the back of the blade is peculiarly formed. The combination of these principles makes this a very light and easy running Saw.

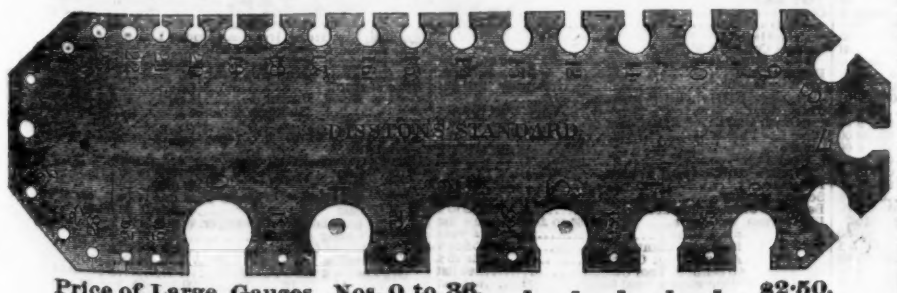
STANDARD WIRE GAUGE.

Perfection Attained. Accuracy Guaranteed.

For the past forty years we have had constant trouble with various kinds of so-called Standard Gauges, and have failed to find one in every ten which could be relied on for accuracy. We have repeatedly sent special orders to both English and American makers, but have failed to obtain them true to the required standard.

To insure perfect accuracy, it is absolutely requisite that our gauge and that of our customers should be alike, and to this end we have been compelled to enter the field in this delicate branch of manufacture. Our success is complete, and we are making a correct Standard Gauge which we warrant, and sell at a lower price than the English.

Price for Small Gauges, Nos. 1 to 26, - - - - - - $1·75.

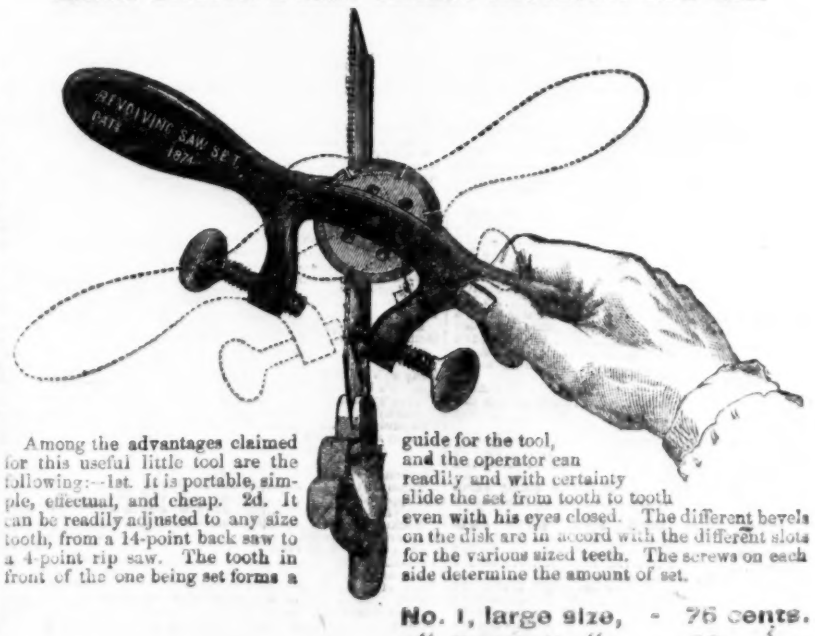


Price of Large Gauges, Nos. 0 to 36, - - - - - - $2·50.
Special Gauges, Special Prices.

We make them to order in different series of high or low numbers, as the various branches of industry may require. For instance, when the articles to be gauged range between Nos. 0 to 10, the purchaser need not be put to the expense of a gauge running up to No. 36, when most of the numbers will be of no use to him.

Where one or more numbers are being constantly used, they wear away faster in proportion, in which event we recommend that duplicate incisions of each of the most used numbers be made in each gauge.

HENRY DISSTON & SONS' PATENT REVOLVING SAW SET.



Among the advantages claimed for this useful little tool are the following:—1st. It is portable, simple, effectual, and cheap. 2d. It can be readily adjusted to any size tooth, from a 14-point back saw to a 4-point rip saw. The tooth in front of the one being set forms a guide for the tool, and the operator can readily and with certainty slide the set from tooth to tooth even with his eyes closed. The different bevels on the disk are in accord with the different slots for the various sized teeth. The screws on each side determine the amount of set.

No. 1, large size, - 75 cents.
" 2, small " - 50 "

HENRY DISSTON & SONS, Front and Laurel Sts., Philadelphia.

New York Wholesale Prices, December 8, 1875.

HARDWARE.

Anvils.
Wright's......⅌ ℔ gold 10½c; over 250 ℔s 11c, gold
Armitage's Mouse Hole......gold 11c
Wilkinson's......⅌ ℔ gold 11c
Eagle Anvils (American)......⅌ ℔ 10c dis 20 %
Apple Parers.
Domestic / Turn Table / Lightning / Hudson's / Reading / Union } $7.75 ⅌ doz
Skeleton Paring, Coring and Slicing......$3 00 ⅌ doz net
Bay State, Paring, Coring and Slicing......$15 00 dis 10 %
Climax Slicer......8 00
Ash Sifters.
J. E. Corning's Barrel Head......dis 10 %
Rival......⅌ doz $12·00 net
Square......per doz $2·50 dis 20 %
Augers and Bits.
Conn. Valley Mfg. Co. / Douglass / Ives / Beecher (French, Swift & Co) / Griswold / Challenge } 1st quality......dis 40&10 %
Nobles Mfg. Co......dis 40 @ 40&5 %
Cook's......dis 40&10&10 %
Diamond Hardware Co......dis 25&10&10 %
Snell Mfg. Co......dis 25 %
Jennings' Bits......dis 10 %
Lewis' Single Twist Bits......dis 30 %
Andrews' Bits......dis 25 %
Griswold's Patent Bits......dis 30 %
Expansive Bits, Clark's....small, $18; large, $26—dis 15 %
" " Ives'......$20 @ $30—dis 30 %
" " Blake's......$20—dis 40 %
Hollow Augers, Douglass' / Ives' / French, Swift & Co. } dis 40 %
" " Bonney's Adjust.. ⅌ doz $48—dis 25&10 %
" " Stearns' " ..⅌ doz $48—dis 25&10 %
" " Ives' Expansive......each $4·50—dis 40 %
" " Universal Expansive.each $4·50—dis 10 %
Gimlet Bits—Screw, $7·50; no screw, $9......dis 20&10 %
Double Cut Gimlet Bits, Shepardson's......dis 20 %
" " Ct. Valley Mfg. Co..dis 30&10 %
" " Hartwell's......dis 50 %
" " Douglass'......dis 25&10 %
" " Ives'......dis 30 %
Morse's Bit Stock Drills......dis 20 %
L'Hommedieu's Ship Augers......dis 20 %
Watrous Ship Augers......dis 20 %
Vaughan's Post Hole—
6 in. $28 60; 7, 8 and 9 in. $25 per doz......dis 20 %
Awls, Brad Sets, &c.
Awls, Sewing, Common......per gross $1·20—dis 15 %
" " Best......per gross $1·60—net
" Shouldered Peg......per gross 2·25—dis 15 %
" Patent Peg......per gross ·60—dis 15 %
" Shouldered Brad......per gross 2·25—dis 15 %
Brad Sets, Aiken's......per doz $13·88—dis 40 %
" No. 42, $10·50; No. 43, $12·50......dis 45&10 %
" Clark's......dis 40&10 %
" Stanley's Excelsior......$18 50—dis 25&10 %
Axes.
Brook's......per doz $12 00 @ 14 00 net
Blood's......per doz $15 00 @ 16 50—dis 20 %
Hunt's......⅌ doz $12 50 @ 14 00
Collins'......⅌ doz 11 00 @ 15 50 net @ dis 5 %
H. Clark's (J. C. W. & Co.) bron'd or red.⅌ doz $10 00 net
Hurd's......⅌ doz 10 50 @ 12 50
Simmons'......⅌ doz 11 00 @ 11 50
Morris'......⅌ doz 12 50 @ 13 50
Red Jacket......⅌ doz 12 00 @ 12 50
Mann's......⅌ doz 11 50 @ 13 00
" Double Bitted......⅌ doz 21 50 @ 22 00
Underhill's......⅌ doz 12 00 @ 13 00
" Crown......⅌ doz 12 50 @ 13 50
John Leverett's......⅌ doz 12 50 @ 15 50
Ten Eyck......⅌ doz $10 00 @ 12 50 net
M. H. Jones & Co......⅌ doz 10 50 @ 11 50 net
Nobles Mfg. Co......per doz $10 50, net
Elephant......per doz $10 50 @ 11 50 net
Axle Grease.—Frazer's......⅌ ℔ 6c.
Balances......dis 35 %
Bands.—Plated......new list dis 50&5 %
Iron Rim......new list dis 25&5 %
Brass (Plated list)......new list dis 50, 10&5 %
Oroide......new list dis 50&5 %
Bells.
Hand, Light Brass......dis 70&10 %
" Extra Heavy......dis 40&10 %
" White Metal......dis 50&10 %
" Silver Chime......dis 20&10 %
" Swiss......dis 25 %
" Globe (Cone's Patent)......dis 20&10 %
Gong, Abbe's......dis 20&10 %
" Yankee......dis 35&10 %
" Barton's......dis 25 %
Crank, Taylor's......dis 25 %
" Brook's......dis 50 %
" Cone's......dis 10 %
" Connel's......dis 50&10 %
Lever, Sargent's......dis 60&10&10 %
" Taylor's......dis 25 %
" Hart, Bliven & Mead Mfg. Co......dis 50&10 %
Pull, " " " "......dis 50&10 %
" Brook's......dis 50 %
" Western......dis 25 %
Call......dis 15 %
Cow—Common Wrought......dis 20&10 %
" Western......dis 20&10 %
" " Sargent's......dis 50&10&10 %
" Kentucky "Star"......dis 20&10 %
" " Sargent's......dis 50&10&10 %
" Dodge's Genuine Kentucky, new list—
Nos. 0 1 1½ 2 3 4 5 6 Hog.
$12·00 10·00 9·00 8·00 6·00 5·00 3·50 2·50 5·00—dis 45 %
" Yaw's Genuine......dis 35 %
" Texas......dis 35 @ 40 %
Bellows.
Blacksmiths', Common, List of Sept. 15......dis 15 %
" Extra and Pittsburgh Pattern......List net
Moulders'......dis 20 %
Hand Bellows......dis 10 %
Blind Adjusters.—Domestic......⅌ doz $3—dis 20 %
Blind Fasteners.
Mackrell's......dis 30 %
Van Sand's, No. 2000, $14·00; No. 3705, $10·50.net @ dis 5 %
Washburn's Patent......⅌ gross $14·00 dis 5 %
Merriman's......new list net
Blind Staples.
Boardman's Patent, ⅜ in. and larger......⅌ ℔ 37 c
" ¼ in......" 42 c
Blocks.
Differential Pulley Blocks......dis 25 %
Tackle, Rope and Iron Strapped, Providence Tool Co.'s list......dis 30 %
Burr's......dis 10 %
Stanley Rule and Level Co......dis 25&10 %
Bolts.
Cast Iron Barrel, Shutter, &c......dis 60&10 %
Cast Iron Chain......dis 60&10&10 %
Wrought Iron Barrel......dis 50, 10&10 %
" " Square......dis 50, 10&10 %
" " Shutter......dis 60&10 %
Wrought Iron Flush, Stanley's......dis 15&10 %
" " " Sargent's......dis 50&10&10 %
Carriage and Tire, Common......dis 75 %
" " " Norway Iron......dis 50&10 %
" " " R. B. & W......(old list) dis 60 %
" " " Philadelphia......dis 60&5 %
" " " Shelton's......(old list) dis 60&10 %
Union Nut Company, old list......dis 65&5 %
Stove......dis 25 %
" R. B. & W......dis 25 %
" Shelton's Shaved Head......dis 25 %
Borax......15c. ⅌ ℔
Boring Machines. Upright. Angular.
Hovey's, no Augers......$3·15 $4·00 net
" with Augers......5·00 6·00 net
Douglass', no Augers......3·25 4·00 net
" with Augers......5·00 6·00 net
Parr's, no Augers......5·00 7·50 dis 30 %
" with Augers......7·50 10·00 dis 30 %
Kellogg's, no Augers......5·25 6·75 dis 15 %
Sweets', "......4·75 6·25 dis 15 %
Snell's, "......4·75 6·25 dis 20
Phillips', with Augers......10·00 dis 25 %
Mortising Machines, $20·00 each......dis 20 %
Bow Pins.
Union Nut Co......new list dis 50&10&5 %
Hotchkiss'......dis 50 @ 55 %
Humason, Beckley & Co.'s......dis 50&10&5 %
Sargent & Co.'s......dis 50&10&10 %
Braces.
Barber's Patent......dis 40&5 %
O. S. Backus......dis 40&10 %
Wilson Mfg. Co......dis 10 %
Spofford's Patent......dis 50 %
Noble's Patent......dis 40&5 %
Ives' Novelty......dis 40&7½&10 %
" Hamden......dis 15&10 %
Common Ball (American)......dis 25 %
Brackets.—Shelf......dis 60&10 @ 65&10 %
Bright Wire Goods......dis 65&10&10 %
Bull Rings.—Union Nut Co......dis 50&20 %
Sargent's......dis 60&10 %
Hotchkiss'......3½ in., $7·25 net
Bung Hole Borers.
Common and Ring......dis 20&10 %
Ives' Tap Borers......dis 10&10 @ 25 %
Enterprise Mfg. Co......dis 20 %
Butchers' Cleavers.
Humason & Beckley Mfg. Co......dis 20&10 %
Bradley's......dis 25 %
Beatty's......dis 20 %
2 3 4 5 6 7 8 8
$19·00 $21·50 $24·00 $27·00 $30·00 $33·50 $36·50 $40·00
Hart Mfg. Co......dis 45&10 %
0 1 2 3 4 5 6
$25·25 $29·75 $34·25 $38·75 $43·25 $48·50 $54·00
Butts.
Wrought Brass......dis 30 %
Cast Brass......dis 20 %
Common Cast, not Drilled.
Fast Joint, Narrow......New list July dis 30&10 %
" Broad " dis 40&10 %
" " Jap'd " dis 35&10 %
Loose Joint, Narrow and Broad " dis 50&10 %
" " " Jap'd " dis 45&10 %
Parliament Butts & Mayer's Hinges " dis 40&10 %
Loose Pin " dis 45&10 %
" Japanned " dis 55&10 %
Loose Pin, Jap'd, Plated Tips " dis 50&10 %
Drilled and Wired.
Fast Joint, Narrow......New list July 1, dis 25&10 %
" Broad " dis 35&10 %
" " Japanned " dis 30&10 %
Loose Joint......new list July 1, dis 45&10 %
" Japanned " dis 45&10 %
Parliament & Mayer's Hinges " dis 35&10 %
Loose Pin " dis 40&10 %
" Japanned " dis 50&10 %
" " Plated Tips " dis 45&10 %
Union Mfg. Co.'s Fancy Butts.—
Figured Enameled Loose Joint......dis 55&10 %
Nickel Plated "......dis 33⅓&10 %
Boston Finish, Plain......dis 80&5 %
" " with Iron Acorns......dis 75&5 %
" " with Sil'd "......dis 65&5 %
Wrought Iron.
Fast Joint, Narrow, Lt. and Regular......dis 30 %
" Broad......dis 35 %
Loose Joint, Narrow and Broad......dis 35 %
Table Butts, Back Flaps, &c......dis 30 %
Inside Blind, Regular......dis 30 %
" " Light......dis 40 %
Loose Pin, Wrt......dis 35 %
Am. Spiral Spring Butt Co., list May 1st......dis 25 %
Union Spring Hinge Co......dis 20 %
Blind Butts, Parker......dis 65&10 %
" Palmer......dis 40 %
" Seymour......dis 60&5 %
" Shepard......dis 60 @ 60&10 %
" Lull & Porter......dis 60 %
" Nicholson......dis 45&10 %
" Huffer......dis 33⅓&10 %
" Garretson, No. 1......dis 65 %
" Clark's, Nos. 1, 3 and 5......dis 65&10 %
" Clark's No. 20......dis 70&10 %
" " Nos. 2, 4, 4½, 6, 8, 10......dis 45 %
Can Opener.
Messenger's Comet......per doz $3·00 dis 20 %
American......per doz 2·25 dis 40 %
Lyman's......per doz 3·75 dis 20 %
No. 4, French......per doz 2·25 dis 40 %
No. 5, Iron Handle......per doz 2·25 dis 40 %
Sprague's......Nos. 1 2 3 4
Per doz $4·00 4·50 5·00 9·00 dis 55&10 %
Star......per doz $5·00 dis 20&10 %
Eureka......per doz $3·50 net
Sardine Scissors......per doz $7·00 dis 40 %
Caps—Percussion, per 1000.
G. D......37 @ 40c
Ely's E. B......1-4s, 56c.; 1-10s, 70c. gold
" Double Waterproof, 1-4s, $1·45; 1-10s, $1·52½c., gold
Colt's......1-10s 80c gold
Carpet Sweepers.
Union......each $2 75 net
Welcome......each 2 75 net
Cartridges.—Metallic......dis 55&5 %
Cards.—Horse and Curry......dis 30&10 %
Cotton......dis 10&10 %
Wool......dis 15&10 %
Carpet Stretchers.
Cast Steel, Polished......per doz $5·00 dis 30 %
Cast Iron, Steel Points......per doz $2·00 dis 45&5 %
Casters.
Bed......dis 30&10 @ 40 %
Plate and Shallow Socket......dis 40&10 %
Deep Socket......dis 35 @ 40 %
Cattle Leaders......new list dis 60&10 %
Chain.
English Coil......net gold
⅌ ℔......11½ 8¾ 7½ 7⅛ 7⅛ 7c
3-16 ¼ 5-16 ⅜ 7-16 ½
Trace, 6½-10-2......by the cask, ⅌ pair, gold 56c
Trace, 7-10-2......by the cask, ⅌ pair, gold, 62c
German Halter Chain......dis 20 @ 25 % gold
German Coil......dis 20 @ 25 % gold
Galvanized Pump Chain......⅌ ℔ 18c
Jack Chain, Iron......dis 50&10 %
" Brass......dis 40&10 %
Chalk.
White......⅌ gross, 57c net
Red......⅌ gross, 90c net
Blue......⅌ gross, $1·00 net
White Crayons......⅌ gross, 16½c net
Chisels.
Socket Framing, Douglass, Extra......dis 60&10&10 %
" " Crossman......dis 50&15&10 %
" " Buck Bros. equivalent to dis 50&17½ %
" " Hart Mfg. Co......dis 60&10 %
" " Merrill......dis 60&10 %
" Firmers, Douglass, Extra......dis 60&10 %
" " Crossman......dis 50&10&10 %
" " Buck Bros. ...equivalent to dis 50&15 %
" " Hart Mfg. Co......dis 60&5 %
" " Merrill......dis 60 %
Socket Corner......dis 60&10 %
Tanged Firmers......dis 40&10 %
" " Butcher's......$5·50 to £ gold
" " Newbould's......$5·50 to £ gold
" " Spear & Jackson's......$5·00 to £ gold
" " Buck Bros (Shank)......$5·50 to £ gold
Clamps.
Iron, Providence Tool Co.'s......dis 20 %
" Adjustable, Gray's......dis 20 %
" " Lambert's......dis 20 %
" " Snow's......dis 40&5 %
" " Hammer's......dis 10 %
" Cabinet......dis 60&10 %
Saw Clamps......see vises
Clips, Axle.
Norway or Best......dis 30 @ 40 %
Superior......dis 50 @ 55 %
Coal Shovels.
Wrought Iron. Nos. 1 2
Long Wrt. H'dles..per gross, $15·00 18·00 dis 25 %
Short " " 12·00 14·00 dis 25 %
Wood Handles " 12·00 14·00 dis 25 %
Gem (Edgar's Pat.) " 15·00 18·00 dis 25 @ 30 %
Cast Iron, Iron Handle......per doz, 75 @ 80c. net
" Wood Handle......per doz, $1·00 net
Coal Hods.
Inch. 14 15 16 17 18
Regular, Jap'd...per doz, $12·00 12·75 13·50 15·50 18·00 dis 60&10 %
Regular, Gal'd... " 15·00 16·00 17·50 19·50 22·50 dis 50&10 %
Ladies' Favorite, Jap'd. ⅌ doz 15·00 16·00 18·00 20·00 dis 50 %
Ladies' Favorite, Galvanized " 19·00 20·00 22·00 25·00 dis 45 %
Funnel Hods.— Nos. 15 16 17
Oriental, Japanned ⅌ doz. $16·50 18·00 20·00 dis 50 %
" Galvanized " 21·50 22·50 24·00 dis 40 %
Morning Glory, Jap'd. " 16·50 18·00 20·00 dis 50 %
" " Gal'd. " 21·00 22·50 24·00 dis 40 %
Iron Clad, Jap'd " 21·50 dis 60&10 %
" " Gal'd " 22·50 dis 50&10 %
Sidney Shepard & Co.'s new list......dis 10 %
Cockeyes....1¼ in., 28c.; 1½ in., 33c.; 1¾ in., 37c. net
Cocks.
Brass Racking......dis 30&10 %
Lock and Globe......dis 30&10 %
Lever Bibbs......dis 30&10 %
Ale and Beer......dis 25&10 %
Coffee Mills.
Board and Box......dis 15 @ 20 %
Brighton......dis 20 %
Increase Wilson's......dis 20 %
Selsor's Pat......$9·50, $10·50—dis 25 %
American (Enterprise Mfg. Co.)......dis 20 %
French Steel......dis 20 %
The Swift......dis 20 %
Compasses and Dividers.
Bemis & Call Co.'s......dis 35&10 %
Cook's......dis 15 %
Excelsior......dis 40 %
Peck Stow & Wilcox......dis 25 %
Miller's Patent......dis 25&10 %
Coopers' Tools.
Bradley's......dis 15 @ 20 %
Chas. E. Little......dis 20 @ 25 %
Swan & Brombacher......dis 15 @ 20 %
Corkscrews......dis 25 %
Corn Knives and Cutters.
Bradley's......dis 10 %
Crow Bars.
Cast Steel......⅌ ℔ 11c. net
Iron, steel points......⅌ ℔ 5c
Crucibles.—Gautier & Co......⅌ No. 5½c
Curling Irons, &c.
⅜, ½, ¾ in., $1·80, $2·00, $2·40......dis 10 %
Curling Tongs......⅌ doz $6 50—dis 15 %
Pinching Irons......⅌ doz 7 50—dis 20 %
Curry Combs.
Hotchkiss' & Kellogg's, Iron & Brass, old list......dis 40 %
Fitch's (List of No. 240, $1)......dis 20&10 %
Rubber......⅌ doz, $9·00—dis 15 %
Wood Tooth (Fuller Bros.)......per doz $2·25 net
Curtain Pins.—Silvered Glass......new list dis 15 %
Cutlery.
American Table { Meriden } New list Jan. '75, dis 25 %
American Pocket { Cutlery Co }......dis 25 %
Am. Pocket—Humason & Beckley Mfg. Co......dis 20&10 %
Am. Miller Bro.'s Cutlery Co......dis 25 %
Naugatuck Cutlery Co......dis 25 %
Dippers.
Britannia......per doz 7·50—dis 30 %; by bbl. dis 33⅓ %
Cocoa, Plain......per doz $8·25—dis 20 %
" Rimmed......per doz 8·75—dis 20 %
Dog Collars.
Embossed Gilt......dis 20 %
Leather......dis 30 %
Brass......dis 25 %
Door Springs.
Gem (V.W.&W.), No. 1 Large, Jap'd ⅌ doz $3·50 }
" " No. 2 Medium ⅌ doz 2·50 } dis 10 %
" " No. 3 Small ⅌ doz 2·00 }
Gray's (V.W.&W.)......⅌ doz 2·50 net
Torrey's Pattern (V.W.&W.)......⅌ doz $2·50 net
Torrey's Patent......⅌ doz $2·50 net
Johnson's......per doz $3 00 net
Philadelphia......5 in., $5·00 8 in., $7·00 dis 15 %
Palmer's Japanned No. 6......⅌ doz $5·00 }
" Coppered " " 6·00 } dis 20 %
" Silvered " " 8·00 }
Challenge— Nos. 6 7 8
Japanned......per doz $2·00 2·50 3·50 }
Coppered......per doz 4·00 4·50 5·00 } dis 10 %
Galvanized......per doz 3·50 4·00 4·50 }
Nickeled......per doz 5·50 6·00 7·00 }
Barker's Concealed......dis 12½ %
Drawing Knives.
Crossman's No. 1......dis 50&15&10 %
Douglass, Extra......dis 60&10&10 %
Hart Mfg. Co., No. 1......dis 60 %
Merrill......dis 60&10 %
Nobles Mfg. Co......dis 15 %
Bradley's......dis 25 %
Adjustable Handle......dis 15 %
Drills and Drill Stocks.
Blacksmiths'......each $2 60 net
" Self-Feeding......each $8 00 net
Breast, P. S. & W......dis 25 %
" Aiken's......dis 25&10 %
" Hotchkiss......dis 10 %
" Wilson's......dis 10 %
" Miller's Falls......dis 25 %
Ratchet, Merrill's......dis 20 %
" Ingersoll's (old list)......dis 35 %
" Whitney's......dis 20 %
Ratchet, Weston's......dis 20 %
" Moore's Triple Action......dis 20 @ 25 %
Wilson's Drill Stocks......dis 10 %
Automatic Boring Tools......each $2·75—dis 20 %
Drill Chucks.—The Danbury..each 10·00, dis 20 @ 25 %
Beach Patent (Morse)......dis 15 %
Egg Beaters.
Monroe's...... 8 in. 10 in.
Per doz $8·00 9·00......dis 10 %
Dover......⅌ doz $6·00—dis 10 %
National......⅌ doz $4·50—dis 20 %
Peerless......⅌ doz $3·00—net
Emery.
Genuine Chester—Regular Nos......⅌ ℔ 6c } dis 10 %
" Flour and FF......⅌ ℔ 4c }
Washington Mills—Regular Nos......⅌ ℔ 8c
" Flour......⅌ ℔ 5c
Enameled and Tinned Ware.
Kettles......dis 30 @ 40 %
Sauce Pans......dis 25 %
Glue Kettles......dis 25 %
Tinned Saucepans......dis 25 %
Escutcheons.
Door Lock......Same discounts as Door Locks
Brass Thread......dis 60&10 %
Wood......dis 25 %
Faucets.
Fenn's......dis 50 %
" Cork Stops......dis 40 %
Star......dis 55&10 %
Frary's Patent Petroleum......dis 15&10 %
Taylor's Pattern "......dis 20&10 %
Wood and Metallic......dis 40 %
Wood, Cork Lined......dis 65 @ 65&5 %
Enterprise Mfg. Co., Self-Measuring......dis 20 %
Felloe Plates......⅌ ℔ 15c; dis 25&10 %
Files.
American File Co......$5 00 to £ currency—dis 20 %
Arcade File Works......$5·00 to £ currency
Auburn File Works......$5 00 to £ currency
Nicholson......new list, Jan. 1, 1875, net @ 5 %
Hartford File Co......$5 50 to £ currency—dis 10 %
L. B. Heller & Co......$5 00 to £ currency
Heller & Bros......$5 00 to £ currency
"Western"......5 00 to £ net
Wheeler, Clemson & Co......$5 00 to £ currency
Rothery's......$5 to £ currency
J. & Riley Carr......5 25 to £ gold
" Horse Rasps......5 50 to £ gold
Stubs'......8 50 @ 9 00 to £ gold
Butcher's......5 25 to £ gold
Walter Spencer & Co.'s "Diamond"......5 00 to £ gold
Spear & Jackson's......5 00 to £ gold
Jowitt's......4 50 to £ gold
Newbould's......5 25 to £ gold
W. K. & C. Peace's "Imperial"......5 25 to £ gold
R. Ibbotson......5 00 to £ gold
Turton Bros. & Matthews......$5 50 to £ currency
Fisher's......4 75 to £ gold
Goodlad's......4 00 to £ gold
Moss & Gamble......5 25 @ 5 50 to £ gold
Thos. Turner & Co. (Peter A. Frasse & Co.) 5 00 to £ gold
" " Horse Rasps......5 25 to £ gold
"Philo Sheffield," P. T. Co......5 00 to £ gold
Limet & Co. (French)......5 00 to £ gold
Fluting Machines.
Mrs. Coles' Pony..4 in., $4·75; 5 in., $5; 6 in., 5·50; 7 in., $6
Knox with 4-inch Rolls......3 80 each net
" " 6 "......4 30 each net
" " 8 "......6 75 each net
O. K......6 50 each net
Peerless, 4-inch Rolls......4 00 each net
" 5 " "......4 75 each net
Excelsior, No. 1......4 75 each net
" No. 2......6 50 each net
Diamond......7 50 each net
Champion, 6 inch rolls......6 00 each net
" 4 inch rolls......5 00 each net
Climax 7-inch Rolls......8 00 each net
" 4½ "......6 50 each net
Empire......4 00 each net
Eureka, No. 1, 7-inch Roll......8 00 each net
" No. 2, 5-inch Roll......6 00 each net
Defiance......4 in., $3·50; 6 in., $4·00; 8 in., $6·50 each net
E. F. M., 4½-inch Roll......5 50 each dis 15 %
" 6-inch Roll......6 00 each dis 15 %
Myers' Fashion Fluter, 4½ inch Rolls......2 75 each net
" Convex Brass Fluter, Sad Iron attachment......per doz $15·00
Domestic Fluter......$1·50 each net
Geneva Hand Fluter......$15 00 per doz net
Fluting Scissors......dis 25&10 %
Forges.
"Empire" (W. P. Kellogg & Co.)......dis 20 %
Forks.
Hay, Manure & Spading......dis 33⅓ %
Plated A 1......dis 50 %
Fry Pans.
Burnished, P. S. & W., new list......dis 50 %
⅌ doz......$3·00 3·75 4·25 4·75 5·25 6·00 7·00 8·00 9·00
No......0 1 2 3 4 5 6 7 8
Smith, Burns & Co., "Excelsior" Polished......dis 35 %
⅌ doz......$3·70 4·00 4·70 5·30 6·00 7·00 8·00 9·00
No......1 2 3 5 6 7 8
Gas Stoves.
Tift & Howard......dis 20 %
Gauges.
Marking......dis 45&10 %
Wire......dis 10 %
" Smith's Patent......per doz $18·00, dis 40 %
Gimlets.
Nail and Spike......dis 25&10 %
Double Cut, Shepardson's......dis 20 %
" " Hartwell's......dis 40 %
" " Ives'......dis 25 %
" " Douglass'......dis 20&10 %
Glue Pots.
Tinned and Enameled......dis 25 %
Family, Howe's "Eureka"......dis 25 %
" L. E. & C.'s "Handy"......dis 25 %
Grind Stone Fixtures
Sargent's Patent......dis 65&10 %
Reading Hardware Co......dis 50 %
J. F. Green & Bro......dis 40 %
Hart Mfg. Co.'s......dis 60&5&10 %
Rick Bros......dis 45&5 %
Hammers.
Emmet Hammer Co.'s Handled......dis 25 %
" " Sledge & Stone.⅌ ℔ 40c.; dis 40 %
Humason & Beckley Mfg. Co......dis 16⅔&10 %
Maydole's......dis 12 %
Henry Hammonds' (Maydole's List)......dis 12 %
Cheney's......net @ dis 5 %
Verree......dis 5 %
Yerks & Plumb......dis 20 %
Magnetic Tack......dis 25&10 %
Warner & Noble's......dis 10 %
Hand Cuffs and Leg Irons.
Tower's Hand Cuffs, $4 00 per pair } dis 25 %
" Leg Irons $6 50 per pair }
Providence Tool Co.'s Hand Cuffs $15 per doz } dis 10 %
" " Leg Irons 25 " }
Handles.
Door or Thumb Latches—
Nos. 0 1 2 3 4
Per doz $0·80 1·00 1·18 1·35 1·50—dis 60 %
Roggin's Latches......40c. @ 50c. net
Bronzed Iron Drop Latches......per doz $1·20 net
Wrought Chest......dis 60&10 %
Surface Chest......dis 65&10&10 %
Flush Chest......dis 60&10&10 %
Lifting......dis 60&10 %
Coffin......dis 50&10 @ 60&10 %
Saw and Plane......dis 25&10 %
Hammer and Hatchet......dis 10 %
N. Carolina Handle Co......dis 15 %
Brad Awl......per gross $3 50—dis 20&10 %
Hickory Firmer Chisel, ass'td " 5 25—dis 20&10 %
" " " large " 6 50—dis 20&10 %
Apple " " ass'td " 6 00—dis 20&10 %
" " " large " 7 50—dis 20&10 %
Socket " " ass'td " 3 50—dis 20&10 %
" Framing " " " 7 00—dis 20&10 %
File......" " 4 00—dis 20&10 %
Auger......" " 6 50—dis 20&10 %
" large " 8 00—dis 20&10 %
Patent Auger, Ives'......dis 25&10 %
" " Douglass'......per set $1 25—dis 10 %
" " Swan's......per set $1 00—dis 20&10 %
Hangers.
Barn Door......dis 65&10 %
"Anti-Friction" No. 1, $1·25; No. 2, $1·50 ⅌ pr. dis 30&5 %
Novelty......dis 30 %
Challenge......dis 40 %
Harness Snaps.
Henshaw's......dis 25&10 %
Judd's......dis 40 %
Fitch's (Bristol)......dis 30 %
Hotchkiss'......dis 10 %
Andrews'......dis 25 %
Sargent's......dis 50&10 %
New York Wire......dis 20&20 %
Hatchets.—Isaiah Blood......dis 15 %
Shingling, Nos. 1 2 3......⅌ doz $7 25 8 00 8 75
Claw, " 1 2 3......⅌ doz 7 75 8 50 9 25
Lathing, " 1 2 3......⅌ doz 7 50 8 00 8 50
Hunt's......dis 15 %
Shingling, Nos. 1 2 3......⅌ doz $7 25 8 00 8 75
Claw, " 1 2 3......⅌ doz 7 75 8 50 9 25
Lathing, " 1 2 3......⅌ doz 7 50 8 25 9 00
Hurd's......dis 30 %
Shingling, Nos. 1 2 3......⅌ doz $8 00 8 50 9 00
Claw, " 1 2 3......⅌ doz 9 00 9 50 10 00
Lathing, " 1 2 3......⅌ doz 8 00 8 50 9 00
Newark's Edge Tool Co.'s......dis 25 %
Shingling, Nos. 1 2 3......⅌ doz $6 50 7 00 7 50
Claw, " 1 2 3......⅌ doz 7 25 7 75 8 25
Lathing, " 1 2 3......⅌ doz 6 50 7 00 7 50
Yerkes & Plumb......dis 20 %
Shingling, Nos. 1 2 3......⅌ doz $7 00 7 50 8 00
Claw, " 1 2 3......⅌ doz 7 50 8 00 8 50
Lathing, " 1 2 3......⅌ doz 7 00 7 50 8 00
Simmon's......dis 15 %
Shingling, Nos. 0 1 2 3....⅌ doz $7 50 8 00 8 50 9 00
Claw, " 1 2 3....⅌ doz 9 00 9 50 10 00
Lathing, " 1 2 3....⅌ doz 8 00 8 50 9 00
Broad, " 1 2 3....⅌ doz 9 00 10 00 12 00
" " 4 5 6....⅌ doz 14 00 16 00 18 00
" " 7 8....⅌ doz 20 00 22 00
Elephant......dis 30 %
Shingling, Nos. 1 2 3......⅌ doz $8 00 8 50 9 00
Claw, " 1 2 3......⅌ doz 9 00 9 50 10 00
Lathing, " 1 2 3......⅌ doz 8 00 8 50 9 00
J. P. Verree & Co......dis 5 %
Shingling, Nos. 1 2 3......⅌ doz $7 00 7 50 8 00
Claw, " 1 2 3......⅌ doz 7 50 8 00 8 50
Lathing, " 1 2 3......⅌ doz 7 00 7 50 8 00
Underhill's......dis 10 %
Shingling, Nos. 1 2 3......⅌ doz 7 25 8 00 8 75
Claw, " 1 2 3......⅌ doz 7 75 8 50 9 25
Lathing, " 1 2 3......⅌ doz 12 00 11 00 13 00
M. H. Jones & Co......dis 25 %
Shingling, Nos. 1 2 3......⅌ doz $8 00 8 50 9 00
Claw, " 1 2 3......⅌ doz 9 00 9 50 10 00
Lathing, " 1 2 3......⅌ doz 8 00 8 50 9 00
Hay Knives.—"Lightning"......per doz $20·00 net
Hinges.
Gate, Western......⅌ doz $6·25—dis 60&10 %
" N. E......⅌ doz 11·25—dis 60&10&10 %
" N. Y. State......⅌ doz 7·20—dis 60&10 %
Rolled Plate......dis 65&10 %
" Raised......dis 65&10 %
Wrought Strap and T......dis 33⅓&10&5 %
Providence Plate. { 6 and 8 in. 11c ⅌ ℔; over 8 in. 9½c ⅌ ℔ }......dis 30 %
Screw Hook and Strap......{ 8, 10, 12 in. 6½c; 14 to 36 in. 5½c }......net
Heavy Welded Hook......{ 8 to 12 in., 6½c; 14 in. & up, 6c }......net
Screw Hook and Eye......{ ⅝ to 1 in., 8½c; ½ in. 9½c; ⅜ in. 11½c }......net
Hoes.
Solid Shank, C. S......⅌ doz $8 00—dis 35 %
Socket......⅌ doz 9 00—dis 35 %
Riveted Eye......⅌ doz 5 00—dis 35 %
Grub......dis 25 %
Planters......net @ dis 5 %
Scovill......add 33⅓ %
Scovill Pattern......net @ dis 5 %
Lane's C. S. Cresent, American Pattern......list net
" " " Scovill Pattern......add 10 %
Hooks.
Bird Cage......dis 60&10 @ 70&10 %
Cotton......dis 50 %
Belt......dis 55 @ 60 %
Bench—Hotchkiss' $5 00 ⅌ doz......dis 10 %
" Weston's No. 1, $6·00; No. 2, $7·00 per doz net
" McGill's......$3 00 per doz, dis 10 %
" Skinner's......per doz $6·25, dis 20 %
Clothes Line, Harness, Wardrobe, Hat and Coat, Ceiling. } Hart's list......dis 60&10&10 %; Sargent's list......dis 60&5&10 %; Reading list......dis 35&10 %
Wrought Staples and Hooks and Staples......dis 70&10 %
Wire Screw Hooks and Eyes......dis 65&10&10 %
Grass......dis 20 %
Whiffletree—Patent......dis 33⅓ %
Hooks and Eyes—Malleable Iron......dis 60&10&10 %
" " Brass......dis 60&10&10 %

Horse Nails.

Nos.		5	6	7	8	9	10
American Pressed	⅌ ℔	22c	20c	20c	20c	20c	20c
Ausable	"	30c	27c	25c	24c	23c	22c
" P't'd & Pol'd	"	31c	28c	26c	25c	24c	23c
" " & Blued	"	32c	29c	27c	26c	25c	24c
Cortland	"	29c	26c	24c	23c	22c	21c
Buffalo Forged	"	31c	28c	26c	25c	24c	23c
Globe, P't'd & Pol'd	"	31c	28c	26c	25c	24c	23c
National, Pointed and Polished, Pat. Fin	"	29c	25c	23c	22c	21c	20c
National, Pointed and Polished, Ex. Fin	"	30c	27c	25c	24c	23c	22c
Perkins' Pointed and Polished	"	30c	27c	25c	24c	23c	21c
Perkins' Pointed and Blued	"	31c	28c	26c	25c	24c	22c
Putnam	"	32c	28c	26c	25c	24c	23c
Vulcan, P't'd & Blued	"	33c	30c	28c	27c	26c	25c

Star Brand, 16c.; Morgan......14c
Putnam......2000 lbs., dis 5 %
Ausable, Am. Pressed, Perkins, Globe, National and New London......1000 lbs., dis 5 %
Vulcan......1000 lbs., dis 7½ %
Vulcan and Brundage......500 lbs., dis 5 %
Horse Shoes.
Burden......⅌ keg, $5·12½
R. I. Horse Shoe Co., Perkins Pattern......⅌ keg, 5·12½
" " R. I. Pattern......⅌ keg, 5·87½
Mule Shoes......⅌ keg, 6·12½
Perkins' Snow......⅌ keg, 6·62½
Boston Rolling Mills Hand Made......⅌ ℔ 8c
Kettles.
Brass......⅌ ℔ 45c net
Enameled......dis 30 @ 40 %
Knives.
Ames' Butcher Knives......dis 20 %
" Shoe "......dis 15 %
" Bread "......⅌ doz $1·50—dis 15 %
Hay and Straw, "Wadsworth's"......dis 20 %
Table and Pocket......See Cutlery
Knobs.
Carriage (Jap'd 80 cents per gross)......dis 60&10 %
Base—Common......net
" Plush Tip......dis 10 %
" Elastic End, No. 8......dis 45 @ 50 %
Door, Mineral......⅌ doz $2·25 }
" Por. Jap'd......⅌ doz 3·00 } dis 40&5 %
" " Plated......⅌ doz 7·00 } & 2 % for cash
" " Por......⅌ doz 7·50 }
Furniture, Plain......75c gross inch, dis 10 %
Ladles.
Melting, Hart's......dis 55&10 %
" Sargent's......dis 50&10 %
" Reading......dis 15&10 %
" Monroe's Patent......per doz $4·00 dis 20 %
Lanterns.
Tubular......No. 0, $11·00; No. 1, $14·00 net
Peerless......No. 5, per doz $11·75—dis 10&10 %
Brady's Patent......dis 10 & 10 %
Ætna......dis 10 & 10 %
Yankee......dis 10 & 10 %
De Beque......dis 10 & 10 %
Police, Small......per doz $7·50 net
Lard Presses.
Draw Cut, 14 inch......each $65 00—dis 20 %
Lemon Squeezers.
Porcelain Lined......per doz $7 00, dis 15 %
Eureka, Tinned......per doz, $10·00 dis 15 %
Dunlap's Improved......per doz $6·00 net
Lines.
Linen Fish......dis 20 %
Cotton Chalk......dis 40 @ 45 %
Sil. Lake Chalk......Nos. 0, 1, 2, 3, $6, 6·50, 7, 7·50, dis 20 %
Mason's......dis 20 %
Locks and Latches.
Cabinet—Gaylord......dis 25 %
" Eagle......dis 25 %
Trunk "......dis 25 %
Langstroth & Crane, Round Key......dis 40 %
" " Flat Key......dis 33⅓ %
Barnes & Deitz, Flat Key......dis 25 %
Yale Lock Co., Flat Key......dis 40 %
Sargent & Greenleaf, Flat Key......dis 20 %
Continental......dis 25 %
Shepardson's......dis 20 %
American Lock Co......dis 33⅓ %
Plate......new list dis 40&2 %
Trenton / Branford / Norwich / Russell & Erwin / Norwalk / Nashua / Mallory, Wheeler & Co. / P. & F. Corbin / Parker & Whipple / Jacobus & Nimick Mfg. Co. } ......dis 40&5 % ...and 2 % for cash
Padlocks, Russell & Erwin / " Mallory, Wheeler & Co. / " Wm. Wilcox & Co. } ......dis 40&5 % ...and 2 % for cash
" Romer's......dis 15 %
" Vulcan Hardware Co......dis 20 %
" New York Lock Co......dis 20 %
" J. H. McWilliams......dis 5 %
" Barnes & Deitz......dis 25 %
" D. K. Miller Lock Co......dis 30&10 %
" Penn Lock Works......dis 20 %
Mallets.—Hickory and Lignumvitæ......dis 20 %
Meat Cutters.
Dixon's (P. S. & W.) Nos. 1 2 3 4
⅌ doz. $14 00 $17 00 $19 00 $30 00 dis 25 %
Miles Challenge......Nos 1 2 3
⅌ doz. $22·00 $30·00 $40 00—dis 30 %
Perry's (P. S. & W.)......Nos. 300 200 400
⅌ doz. $22·00 $27·00 $40·00—dis 35 %
Woodruff's (P. S. & W.)......Nos. 100 150
⅌ doz. $15·00 $18·00—dis 25 %
Hales'......Nos. 11 12 13
⅌ doz. $27·00 $33·00 $42·00—dis 35&2 %
Draw Cut......Nos. 5 6 7
Each $56·00 $90·00 $250 00—dis 20 %
American......dis 25 @ 25&5 %
No. 1 2 2½ 3 4 B 5
Each $6·00 $9·00 $12·00 $15·00 $30·00 $60·00 $75·00
Molasses Gates.
Stebbins'......dis 62½&10 %
" Tinned ends......dis 40&10 %
Bush's......dis 20 %
Lincoln's......dis 50&10 %
Weed's......dis 15 %
Mortars and Pestles.
Iron......net
Nail Pullers.
Taft's......per doz $24·00 net
Nails......10d., $3·00 @ $3·10 net
Nuts and Washers.
Nuts......large, 7c; small, 10c off list.
Washers......large, 9c; small, 12c off list.
Oilers.
Miller's Zinc, Brass and Copper......dis 40 %
Sheet Metal Screw, Zinc, Brass and Copper......dis 40 %
Olmsted's......dis 25&10 %
Broughton's......dis 25&10 %
Malleable......per doz $5 00 dis 10 %
Prior's Patent or "Paragon"......dis 40 %
Ox Shoes.
Concave......⅌ ℔ 18c net
Ox Balls......dis 60&10 %
Pencils.
Faber's Carpenters'......net
" Round Gilt......⅌ gross $6 00 net
Dixon's Lead......⅌ gross $4·50 net
" Lumber......⅌ gross 9·00 net
Picture Nails and Knobs.
Brass Head......dis 60&10 %
Porcelain Head......dis 55&10 %
Richards' Patent......dis 40 @ 40&10 %
Judd's......dis 60&10 %
Pinking Irons......per doz $2 75—dis 65 %
Planes and Plane Irons.
First Quality......dis 35 %
Second Quality......dis 50 %
Bailey's Patent Adjustable......dis 25&10 %
Plane Irons, Butcher's......$5 50 to £ gold—new list
" Buck Bros......$5 50 to £ gold
" Bailey's Patent......dis 25&10 %
" Auburn Tool Co.'s......dis 25 %
" Greenfield Tool Co......net list
" Middletown Tool Co......net list
" Ohio Tool Co......dis 10 %
" Spear & Jackson's......5 00 to £ gold
" Sandusky Tool Co......dis 10 %
Plow Bits, Greenfield Tool Co......dis 10 %
Pliers and Nippers.
Button's Patent......dis 33⅓ %
Hull's Patent Nippers..No. 1, $15; No. 2, $21 ⅌ doz dis 25 %
Leach's Patent Wire Cutters......per doz $6 50—dis 15 %
Gas Pliers......dis 25 %
Plumbs and Levels.
Stanley R. & L. Co.'s Pat. Adjustable......dis 65&10 %
" " " Non-Adjustable......dis 65&10 %
Chapin's......dis 66⅔&10 %
Standard Rule Co.'s New Adjustable......dis 60&10 %
Standard Rule Co.'s Non-Adjustable......dis 60&10&10 %
Pocket Levels......dis 50&10 %
Johnson's Patent Adjustable......dis 60&10 %
Davis' Patent......dis 65&10 %
Pulleys.
Judd's Axle......per doz $0·75 dis 40 %
Hot House and Tackle......dis 60&10 %
Jap'd Screw......dis 60&10 %
Brass Screw......dis 60&10 %
Jap'd Side......dis 60&10 %
" Clothes Line......dis 60&10 %
Hay Fork......per doz $4 50 @ 5 00, dis 10 %
Pumps.
Douglas Cistern, etc......new list dis 25 %
" S. & F......new list dis 20 %
Union Mfg. Co's. Cistern and Pitcher......dis 25 %
" " " Rams......dis 20 %
" " " Garden Engines......dis 10 %
Cucumber (Burlingham & Purdy)—
6 ft. No. 8, with 12 ft. pipe......$4·00 net
ft. No. 1, with 12 ft. pipe......4·50 net
From 6 to 36 ft. add 20 cents per ft.
Pipe, 8c. per ft.; Coupling, 20c. per ft.
Punches.
Belt or Drive......per doz $1·50 net
Spring......per doz $6·50—dis 20&10 %
" Leach's Patent......dis 15 %
Rail.
Sliding Door, Wrought Brass......⅌ ℔ 44c., dis 10 %
" " Iron, Painted......⅌ foot 9c—dis 55&10 %
Barn Door, ½, ⅝ and ¾ inch......dis 60&10&10 %
" " for N. E. Hangers......dis 60&10&10 %
Rakes.
Cast Steel......dis 33 %
$8 00 9 00 10 00 11 00
8 10 12 14 teeth.
Malleable......dis 35 %
$5 00 5 50 6 00 6 50
9 11 13 15 teeth.
Razor Straps.
Evan's......dis 40 %
Imitation Emerson......⅌ doz $2·75—dis 40 %
Hunt's......dis 40 %
Chapman......dis 10 @ 15 %
Torrey's......dis 10&10 %
Saunder's......net @ 10 %
Rivets.—Old Colony.
Iron and Tinned......dis 55 %
In bulk......dis 40 %
Copper Rivets and Burrs......dis 20 %
Nos. 7 8 9 10 11 12 13 14 15
Per lb. 49c 50c 52c 54c 56c 58c 60c 65c 70c
Rivet Sets......dis 10 %
Rods.
Stair......dis 40 %
" American Patent......dis 33⅓ %
Rollers.
Barn Door......revised list dis 60, 10&10 %
Novelty......dis 10 %
Rope. Manufacturers' List of Sept. 28, 1875.
Manila......½ inch and larger ⅌ ℔ 14½c
"......⅜ inch ⅌ ℔ 15 c
"......¼ and 5-16 inch ⅌ ℔ 15½c
Manila Lath Yarn and Tar'd Rope......⅌ ℔ 14 c
" Hay Rope......⅌ ℔ 15 c
Sisal......½ inch and larger ⅌ ℔ 11½c
"......⅜ inch ⅌ ℔ 12 c
Sisal......¼ and 5-16 inch ⅌ ℔ 12½c
" Hay Rope......⅌ ℔ 12 c

Rules.

	Boxwood.	Ivory.
Chapin's	dis 60&10 %	dis 50&10 %
Stanley	dis 60&10 %	dis 50&10 %
Standard	dis 60&10 %	dis 50&10 %
Stephens'	dis 60&10 %	dis 50&10 %
Willis Thrall & Son	dis 60&10 %	dis 50&10 %

Sad Irons.
From 4 to 10 lbs......⅌ ℔ 3½ @ 3¾c net
Sad Iron, Nickel Stand attached......⅌ ℔ 9c
Self-Heating......per doz $10 00 net
" Tailors'......per doz 22 50 net
Sand Paper.
Beader & Adamson's Flint, 00 to 1½...$4 25 ⅌ ream }
" " " 2, 2½ & 3. 4 75 " }
" " " Assorted. 4 25 " } dis 15 %
" " Star......⅌ ream $3 25 }
" " Emery...⅌ ream $6 50 @ 11 50 }
New England, same list as B. & A. Flint......dis 15 %
H. B. & M. Roman Flint " "......dis 15 %
Sash Cord.
Common......⅌ ℔ 18 @ 20c. net
Patent......⅌ ℔ 24c. net
Silver Lake, Russia Flax......⅌ ℔ 55c }
" " White Cotton......⅌ ℔ 55c } net
" " Drab Cotton......⅌ ℔ 60c }
Raw Hide......dis 15 %
Sash Locks.
Clark's, Nos. 1 and 2, $10·00 per gross......dis 33⅓ %
Ferguson's......dis 33⅓ %
Norwich......dis 25 %
Walker's......dis 10 %
New England......dis 20 %
Sash Weights.—Solid Eyes......⅌ ℔ 2c
Sausage Stuffers or Fillers.
Miles......⅌ doz $20—dis 30 %
Stow or Perry......⅌ doz No. 1, $15; No. 0, $21—dis 25 %
Draw Cut No. 4......each $30 00—dis 20 %
Saw Frames......per gross $18 00—dis 15&10 %
Saw Rods......$10 list, dis 10&10 %
Saws.
Spear & Jackson's......$3 50 to £ gold
Am. Saw Co......new list
Perforated Cross Cuts, all kinds......68c ⅌ foot
Inserted Tooth......dis 10 %
All else......dis 12½ %
Disston's Circular......dis 20 %
" Mill......dis 25 %
" Cross Cut......dis 15 %
" other kinds......dis 12½ %
H. W. Peace's Circulars......dis 25 %
" Other kinds......dis 20 %
Wm. McNiece's Hand, Cross Cut and Circular......new list dis 15 %
Wm. McNeice's Patent Pole Pruning Saw......dis 10 %
" " " Compass Saw......net.
E. M. Boynton's Lightning......dis 40 %
" " Others......dis 15 %
Wheeler & Clemson Mfg. Co.'s Hand......dis 15 %
" " " " Cross-Cut......dis 30 %
Livingston's Butcher and Kitchen......dis 15 %
Livingston's Framed Wood—
Nos. 101 102 103 104 105 106
Per doz $12·00 10·00 12·00 9·00 8·00 6·00 dis 10 %
Saw Sets.
Stillman's Genuine......⅌ doz $5·00—dis 10 %
" Imitation......⅌ doz 3·25—dis 20 %
Common Lever......per doz $2·00 dis 20 %
Leach's......No. 0, $8·00; No. 1, $15·00 dis 15 %
Nash's......No. 1, $8·50; No. 2, $5·50 dis 20&10 %
Hammer, Hotchkiss......$5·50 dis 10 %
" Bemis & Call's......dis 20 %
" Aiken's Genuine......$14·80 dis 40 %
" " Imitation......$7·00 dis 25&10 %
Boynton's......per doz $12·00 dis 30 %
Scales.
Hatch, Counter......⅌ doz $36—dis 25 %
" Tea......⅌ doz $15—dis 25 @ 30 %
Union Platform......$6·00, $7·00—dis 40 %
Turnbull's......dis 15 @ 20 %
Brown's......dis 25&5 %
Fairbanks'......new list dis 15 @ 20 %
Howe's......dis 15&5 %
Chatillon's Grocers'......dis 25 %
" Eureka......dis 20 %
Universal Family......dis 25 %
Scale Beams.
No. 1 300 to 1200 lbs......90c ⅌ cwt } dis 35 @ 40 %
No. 2 " "......75c ⅌ cwt }
Scrapers.
Box, 1 Handle......per doz $5·00, dis 10 %
" 2 "......per doz 6·00, dis 10 %
Foot......dis 60 & 10 %
Ship (common)......per doz $3 00 net
Ship—Providence Tool Co......dis 10 %
Screw Drivers.
Hart, Bliven & Mead......dis 55&10 %
Douglass Mfg. Co......dis 25&10 %
" " No. 1......dis 20&10 %
Disston's......dis 40&10 %
Screws.
Flat Head Iron, List of September 1, 1875......dis 40 %
Round Head Iron " " "......dis 30 %
Flat Head Brass " " "......dis 40 %
Round Head Brass " " "......dis 30 %
Round Head Silver Capped, List March 1......dis 25 %
Hand Rail......dis 50&10 %
Coach or Lag......dis 30&10 @ 40 %
Coach, Patent Gimlet Point, List Jan. 1, 1875......dis 35 %
Bed......list net
Japanned, List of Sept. 1, 1875......Net
Machine—Flat Head, Iron, List Jan. 12, 1875......dis 25 %
" " Brass, " "......dis 15 %
Round Head, Iron, " "......dis 20 %
" Brass, " "......dis 10 %
English, Flat Head, Iron; American List, Sept. 1, 1875
Nettlefold & Chamberlain's......dis 30&5 %
Birmingham Sc'w Co......dis 30&5 %
Birmingham Screw Co., Brass......dis 30&10 %
Bench—Iron......dis 60, 10&10 %
" —Wood, Beach......⅌ doz $3·00 net
" " Hickory......dis 20&10 %
Hand......dis 25&10 %
Jack—Bell Bottom......dis 15 %
Scythes.
Blood's German Steel, Grass......⅌ doz $10 00 }
" Cast " "......⅌ doz 11 00 }
" Silver " "......⅌ doz 12 00 }
" German " Grain......⅌ doz 14 00 } dis $1·50 from list
" Cast " "......⅌ doz 15 00 }
" Excelsior and Granger......⅌ doz 11 00 }
" Young America......10 50 }
" Silver Clipper......13 00 }
Scythe Snaths......dis 20 %
Sieves.—Mann's Patent......New list net
14 16 18 20 24 30 mesh
Iron...$3·00 3·00 3·25 3·50 3·75 4·75 ⅌ doz
Plated. 3·50 3·75 4·00 4·25 4·50 6·00 "
Wood Rims......18 mesh, Small, $1·50 per doz, dis 10 %
" "......" Regular, 1·90 per doz, dis 10 %

Shears and Scissors.
Cast Steel....dis 75&10 %
Cast Iron....New l'st July 15....dis 30 %
Heinisch Sons' Trimmers and Scissors....dis 65 %
" " Standard quality Shears and Trimmers....dis 40 %
Seymour's Straight Trimmers....dis 60&10 %
" Scissors....dis 50 %
Pruning....per doz $10 00—dis 35 %
Barnard's Lamp Trimmers....per doz $3 75

Sheaves.
Sliding Door, M. W. & Co. list....dis 40&5&2 %
" R. & E. list....dis 50&5&2 %
" Patent Roller....dis 25 %
" " " Hatfield's....dis 50 %
" Russell's Anti-Friction....dis 50&2 %
Sliding Shutter, R. & E. List....dis 50&5&2 %

Shovels and Spades.
Ames....dis 20 %
Birmingham Shovel Co....dis 15 %
Rowland's....dis 25 %
Old Colony....new list dis 10&5 %
Middleboro' Shovel Co....new list dis 20 %
C. E. Jennings & Co....New list dis 30&10 %
Dunning's Shovels and Scoops....dis 20&7½ %

Shovels and Tongs.
Iron and Brass Head, R. & E. list....dis 50&10&2 %
" " Hart's....dis 55&2&10 %
Polished Steel....dis 50&10&2 %

Skates.
Barney & Berry's
N. Y. Club....℔ pair $2 75
B. & B. Club....3 50
All Clamp....4 25
Rink....8 00 } dis 25 %
Florence Steel....$1 00 dis 25 %
" Spring....3 00 dis 30 %
" All Clamp....3 50 dis 30 %
Peck & Snyder's—
No. 1, Blued....per pair $5 00
No. 2, Nickel Plated....per pair 6 00
No. 3, " extra..per pair 8 00
Clipper Club Blued....per pair 3 50
" " Full Pol'd....per pair 4 50
" " " and Nickel Plated....per pair 6 00 } dis....25 %
Acme Club Skates.—Nos. 5 7 10 12 14
Pair $4 00 5 00 7 00 7 50 8 00 dis 20 %

Slates.
Square Frames, Round Cornered, by case....dis 65&10 %
Less than a case....dis 65 %

Spoke Shaves.
Iron....dis 33⅓&10 %
Wood....dis 30 %
Bailey's....dis 20&10 %

Spoke Shave Irons.
Spear & Jackson's....$5 00 to £ gold

Spoons.
Tinned Iron....dis 10 %
By the case....dis 20 %
Basting....dis 10 %
Britannia....dis 50&5 @ 55 %
" Boardman's, new list....dis 55 %
Rogers & Bro., A 1....dis 50 %
Derby Silver Co....dis 50 & 5 %
Holmes, Booth & Haydens....dis 50 %
Nickel Silver Co....dis 40 %
German Silver....dis 30 @ 33⅓ %
Tin (P. S. & W.)—
Teas....$1 50 ℔ gross, net
Tables....2 75 " net

Stocks and Dies.....dis 5&10 %

Stone.
Hindostan Stone....℔ ℔ 6c
" Axe Stone....℔ ℔ 8c
" Slips....℔ ℔ 10c } dis 20&10 %
Sand Stone....℔ ℔ 6c—dis 20&10 %
Washita Stone....No. 1, ℔ ℔ 30c net
" ....No. 2, ℔ ℔ 25c net
" Slips....No. 1, ℔ ℔ 60c net
Arkansas Stone....No. 1, ℔ ℔ $1 35 net
" Slips....No. 1, ℔ ℔ $2 50 net
Grindstones, Family, J. F. Green & Bro....dis 20 %
" " Loring's....dis 10 %

Stove Polish.
Joseph Dixon's....℔ gross, 6 00
Gem....℔ gross $4 25 @ 4 50 net
Gold Medal....℔ gross $6 00 dis 25 %
Rising Sun....per gross $5 75 net

Squares.
Steel....dis 50 %; full cases, dis 50&10 %
Iron....dis 50 %; full cases, dis 50&10 %
Nickel Plated....add $2 50 @ $4 00 ℔ doz net
Try Squares and T Bevels....dis 45&10 %
Star Try Squares and Bevels....dis 30 %
Disston's Try Squares No. 1....dis 20 %
" " No. 2....dis 40 %
" " Improved....dis 20 %

Tacks.
Full Weight American Iron....dis 45&7½ %
Half Weight American Iron....dis 72½&7½ %
Carpet....dis 7½ %
Brads American Half Weight....dis 50&7½ %
Finishing Nails.... ⅜ ⅝ ¾ 1 1½ in. and over
℔ ℔....25c 20c 18c 14c 12c dis 7½ %
Trunk and Clout.... ⅜ ⅝ ¾ 1 1½ in. and over
℔ ℔....25c 20c 18c 14c 12c dis 7½ %
Copper Tacks....℔ ℔ 50c—dis 7½ %
Iron Shoe Nails, ℔ ℔ 4-8 and longer, 9¼c; 3½-8, 10c....dis 7½ %
Double Pointed....dis 33⅓&10 %

Tapes, Measuring.
American Flag and Cap Co....dis 20 %
Eddy's....dis 20 %

Tea Trays.
American Tea Tray Co....dis 15 %

Thermometers.
Tin Case....dis 50&10 %

Toe Calks.
Winsted....℔ ℔ 13c., dis 10 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion)....dis 20 %
Wood Bottom....per doz $12—dis 25&10 %
All Iron....per doz $10 50—dis 25&10 %

Tinners' Tools and Machines.
P. S. & W....dis 10 %

Traps.
Game, Newhouse....dis 25 %
" Peck, Stow & Wilcox....dis 30 %
" Hotchkiss....old list dis 30 %; new list dis 10 %
" Blake's Patent....dis 30 %
Mouse, Wood Choker....℔ doz holes. 15 @ 16c
" Patent Chocker (Union Nut Co.)....℔ doz holes 16 @ 18c net
" Round, Wire....℔ doz $1 50 to 2 00 net
" Square, "....℔ doz 2 00 to 2 50 net
" Cage....℔ doz 2 50, dis 10 %
" Patent Self Setting....per doz holes 2c net

Trowels.
Lothrop's Brick and Plastering....dis 10 %
Disston's Brick and Plastering....dis 12½ %
Rose's Brick....dis 5 %
Brades' Brick....gold. dis 10 %
Worrall's Brick and Plastering....dis 20 %
Garden....dis 25 %

Triers.
Butter and Cheese....dis 35 %

Ventilators (Window).
Nickel and Gilt....per dozen $16 00 @ 18 00

Vises.
Solid Box, Trenton...40 to 160 lbs., 16c.; 160 and over, 20c
" " Wilson's....30 to 160 lbs., 18c } 160 and over, 22c } dis 35 %
" " Peter Wrights....16c gold
Parallel, Parker's....dis 20 %
" Wilson's....dis 30&10 %
" Sargent's....dis 55&10 %
" Trenton....dis 15 %
" Backus and Union....dis 25 %
" Merrill's....dis 15 %
" Fisher & Norris....dis 15&10 %
" Buffalo....dis 25 %
" Stevens'....dis 15 @ 20 %
Saw Filers, Bonney's....per doz $20 00 dis 20 %
" Stearn's....per doz $20 00 dis 20 %
" Hopkins'....per doz $17 50 dis 10 %

Wheel Barrows.
Canal (Pugsley & Chapman)....new list dis 15 %
Coal, Garden and Stone (Pugsley & Chapman)....dis 25 %

Well Wheels.
Revised list....dis 60&10 %

Wire.
Brass and Copper....List of Oct. 27, 1875, net
Bright and Annealed....Nos. 0 @ 18 dis 45 @ 50 %
" " ....19 @ 26 dis 50 @ 55 %
" " ....27 @ 36 dis 55 @ 60 %
Coppered....0 @ 18 dis 40 @ 45 %
Galvanized, Nos. 0 to 9....℔ ℔ 8 @ 8½c net
Galvanized, Nos. 10 to 18....market list dis 15 @ 20 %
Tinned....dis 25 @ 30 %
Cast Steel....dis 15 @ 20 %
Tinned Broom Wire....dis 35 @ 40 %
Galvanized Telegraph, Nos. 8 and 9....℔ ℔ 9c
Galvanized Telegraph, Nos. 10 and 11....℔ ℔ 10c
" " 12....℔ ℔ 10½c
Annealed Fence, Nos. 8 and 9....dis 50 %
" Grape, " 10 to 14....dis 50 %
Fence Staples....℔ ℔ 7¾ @ 8c
Stubs' Steel Wire....$7 00 to £ gold
Judd's Picture Wire....dis 50 %
Clothes Line Wire....per coil 60c. net

Wrenches.
American Adjustable....dis 45 %
Baxter's Adjustable "S"....dis 20 %
" Diagonal....dis 20 %
Collins & Co.'s....dis 45 %
Coes' Genuine....dis 40&10 %
" Pattern (Wrought)....dis 50&10 %
" " (Malleable)....dis 65&10 %
Diamond Hardware Co....dis 40 %
Lindsay's Patent....dis 25 %
Taft's Pattern....dis 70&10 %
Davis Patent Duplex....new list dis 25 %
Bemis & Call's Patent Combination....dis 20&5 %
" " Merrick's Pattern....dis 25&2½ %
" " Brigg's Patent....dis 15&10 %
Aiken's Pocket (Bright)....per doz $10 00—dis 50&10 %

Wringers.

		Less than 2 doz	2 doz lots
Providence	℔ doz	$72 00	$70 00
Reliance	℔ doz	69 00	67 00
Universal—Extra	℔ doz	72 00	70 00
Novelty	℔ doz	73 00	70 00
Sherman	℔ doz	73 00	70 00
Eureka	℔ doz	60 00	58 00
Wringers without Cog Wheel	℔ doz	60 00	58 00

TIN WARE AND TRIMMINGS.

STAMPED TIN WARE, dis 10 %.
COMMON STAMPED WARE, &C.
Bucket Covers.

Quarts	½	1	2	3	4
Inch	4½	5 3-16	6 5-16	6¾	7 11-16
Per gross	$2 00	2 40	2 40	4 25	5 75
Quarts		6	8	10	12
Inch		8½	9½	9¾	10 9-16
Per gross		$6 50	8 00	8 50	11 50

Cake Box Covers.

	Small.	Medium.	Large.
Inch	11½	13½	15½
Per gross	$15 00	18 00	22 00

Pot Covers.

Inch	7½	8½	8¾	9¼	9¾	10¼
Per gross	$5 75	6 00	6 25	6 75	7 25	8 25
Inch	10¾	11¼	11¾	12¼	12¾	13¼
Per gross	$8 75	9 50	10 00	13 00	13 75	16 50

Pie, Dinner or Scolloped Plates.

Inch	6	7	8	9	10	11
Per gross	$4 00	4 50	5 50	5 80	8 50	10 50

Deep Pie Plates.
Inch....9 10
Per gross....$8 50 10 50

Jelly Cake Pans.
Inch....9 10
Per gross....$7 50 10 00

Coffee Pot Covers.

Plain	1½	2	3	4	5	6 qts.
Inch	3	3½	3¾	4½	5	
Per gross	$1 15	1 40	1 60	2 00	2 75	3 00
Rimmed	2¾	3	3½	4	4½ inches.	
Per gross	$2 25	2 50	3 00	3 50	4 00	

T. K. Breasts only.

Inch	7½	8	8½	9	9½	10	10½	11
Per gro.	$6 00	6 50	6 75	7 25	7 75	9 50	10 00	12 00 13 00

Grater Plates.
Sheet....½ ¾ 1
Per gross....$3 00 6 00 11 50

Scolloped Cake Pans.
Small. Large.
Without Tubes....per gross, $8 00 11 50
With Tubes...." 10 50 14 00

Stamped Square Pans.
No....½
Per gross....$7 50 14 50

Common Square Pans (One Sheet).
Per gross....$11 50

Milk Skimmers (Plain or Pierced).
Per gross....$4 00

Lettered Plates
Inch....5½ 6
Per gross....$3 25 4 00

Steamer Bottoms.
Add $1 per gross, or 10c. per doz. to list of Pot Covers.

Tin Stove Pipe Rings.

Inch	4	4½	5	5½	6	7
Plain....per gro.	$4 00	4 50	5 00	5 50	6 00	7 00
Jap'd or Burn'd..	6 00	6 50	7 00	8 00	9 50	10 00

Coffee Boiler Lips.
Small. Large.
To Rivet....per gross, $0 80 1 10
To Solder...." 1 25

STAMPED DEEP AND RETINNNED WARE,
Discount 20&10 %.

Plain Stamped Water Dippers.

	½ pint.	Pint.	Quart.	quarts.	2½ quarts
Per doz	90	1 15	1 50	1 85	2 50

Retinned Milk Pans.

Qts...	½	1	1½	2	3	4	5	6	8	10	12
℔ doz.	1 20	1 50	1 75	2 00	2 25	3 15	3 50	3 85	4 75	5 25	5 75

Dipper Bowls, Plain Stamped—
Pints....½ 1 Quarts.... 1 2 2½
Per doz. 50 75 Per doz... 1 00 1 25 1 72
Dipper Bowls Retinned—
Pints....½ ¾ 1 Quarts.... 1 2 2½
Per doz. 75 95 1 05 Per doz .. 1 40 1 75 2 25

Pans.
Dish Pans, Retinned Deep—

Quarts	7	8	10	14	17	21	30
Per doz.	8 50	9 50	11 00	13 00	16 00	19 00	30 00

JAPANNED TIN WARE, dis 5 %.
Cannisters, Common....Pound ½ 1 2 3
Per gross $10 50 15 00 24 00 30 00
Canisters, Hinged....Pound 1 1½ 2 3 4
Per gross $19 00 25 00 32 00 37 00 42 00
Canisters, Square....Pound 3 4 6 8 12 16
Per doz $3 00 4 25 5 00 5 75 8 00 9 00
Candlesticks, Japanned....No. 1 2
Per gross $8 00 7 00
Cake Boxes, Round....per nest, $3 25
" Square....per nest, 4 25
Chamber Pails, Japanned
Nos....2 3 4 5
Green, per doz....$8 00 9 00 11 00 13 00
Oak....$9 00 11 00 12 00 13 50
Dust Pans, Corrugated....per gross, $22 00
Box Graters....per gross, $8 75
Molasses Cups....Pint ½ 1 2 4
Per gross $13 00 16 00 28 00 42 00
Lunch Boxes, per doz....7 in $2 00; 8 in. $2 50
Pepper Boxes Japanned..℔ gross small, $3 00; large, $4 00
Toy Banks, House....No. 1 2
Per gross $7 00 5 50
Toy Banks, Gothic....No. 1, $6 00, No. 2, 4 00 per gross
Toy Cups, Straight....No. 1 2 3
Per gross $3 75 3 25 2 75
Toy Cups, Flaring....No. 1, $4 25; 2, $3 75 ℔ gross
Toy Pails, Covered....No. 1, per gross $4 00
Toy Rattles....per gross, $2 00
Trunks. Wire Handled....per nest (5) $1 75
Spittoons, Tin....per gross, $27

PLANISHED TIN WARE, dis 20 %.
Tea Pot Handles—P. S. & W....dis 20 %
Stow's Patent Hollow Tea Pot Handles.
No. 1, Small 4½ inches....per gross, $11 50
No. 2, Medium, 5¾ "....12 50
No. 3, Large, 6¾ "....13 50
No. 4, Ex. Large 7½ in., for Wash Pitchers &c....18 00
Solid Iron. Tin Tipped.
No. 10, Small, 4½ inches....per gross, $9 00
No. 15, Medium, 5½ "....9 50
No. 20, Large, 6½ "....10 75
Stow's Patent Hollow Tea Pot Handles, Adamantine Bronze—P. S. & W
No. 12, Bronzed and Tin-Tipped....per gross, $13 50
Saucepan Handles, Of Best Malleable Iron.
P. S. & W....dis 20 %
Japanned.
No. 1, 5½ inches long....per gross, $3 50
No. 2, 6 "....3 75
No. 3, 6½ "....4 00
No. 4, 7½ "....4 25
No. 5, 8 "....4 50
No. 6, 9 "....4 75
Tinned.
No. 1, 5½ inches long....per gross, $4 25
No. 2, 6 "....4 50
No. 3, 6½ "....4 75
No. 4, 7½ "....5 25
No. 5, 8 "....5 50
No. 6, 9 "....5 75
Japanned....per lb., 16
Tinned...." 20
Iron Kettle Ears (P., S. & W.)....dis 45 %
Half gross pairs in a package.
Tinned

Nos.	1	2	3	4	5	6	7	8
Per gross pairs	88c	1 00	1 50	1 75	2 10	2 75	3 75	4 50

Black.

Nos.	1	2	3	4	5	6	7	8
Per gross pairs	75c	88c	$1 35	1 50	1 75	2 25	2 75	4 00

Tinned Tea Kettle Ears.
Nos....4 5 6
Per gross pairs....$1 75 2 10 2 75
Extra Heavy Tinned Kettle Ears—French Pattern.
Nos....1 2 3 4 5 6 7
Per gross pairs....$1 00 1 25 1 50 1 75 2 00 2 50 3 00
Malleable Iron Kettle Ears for Coal Hods, &c.
P., S. & W....dis 20 %
No. 10 Small....℔ ℔. Tinned 20c; Black, 16c
No. 20 Medium....℔ ℔, " 20c; " 16c
No. 30 Large....℔ ℔, " 20c; " 16c
No. 40 Extra Large....℔ ℔, " 20c; " 16c
In cases of 100 lbs. each.
Milk Can or Boiler Handles—(P. S. & W.) 4½ in..dis 25 %
Plain, 8c.; Japn'd, 9c.; Tinned, 15c. per lb.; Malleable Clips or Ears to match, Tinned....20c per lb.
Toilet Ware Handles—4½ inches (P. S. & W.)....dis 35 %
Plain with drilled holes, per lb....9c
Plain with Cast " "....8c
Plumbers' Scrapers—(P. S. & W)....dis 25 %
Extra quality, length 6 in., per doz....$4 00

METALS.

IRON.—Duty Bars, 1 to 1½ cents per lb., Sheet, Band, Hoop and Scroll, 1½ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 3 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. Railroad, 70 cents per 100 lbs. Boiler and Plate, 1½ cents per lb.

Pig Iron—American.
Foundry No. 1....℔ ton, $23 00 @
Foundry No. 2...." 21 00 @
Gray Forge...." 15 50 @ 20 00
Scotch.
Coltness...." 33 00
Glengarnock...." 31 00
Gartsherrie...."
Eglinton...." 29 50 @ 30 00
Summerlee...."

Bar Iron.
Am. Refined, at mill....2·4c. @ 2·5c

Rails.
American, at works, currency....℔ ton 42 00 @ 46 00
Old Rails...." 22 50 @ 25 00

Scrap.
Wrought Scrap...." 30 00 @ 31 00

Bar Iron from Store.
Common Iron.
¼ to 2 in. round and square.... } ℔ ton $57 50
to 6 in. x ⅜ to 1 in.... }
Refined Iron.
¼ to 2 in round and square.... } " 57 50 @ 60 00
1 to 6 in. x ⅜ to 1 in.... }
1 to 6 in. x ¼ and 5-16....℔ 62 50 @ 65 00
Shafting Iron—2½ to 4 in...." 62 50 @ 75 50
Rods—3-16 to ⅝ round and square.." 110 00 @ 65 00
Bands...." 70 00 @ 72 50
Hoops—⅜ to 3 in...." 130 00 @ 80 00
Swedish Iron.
Ordinary sizes...." 130 00 @ 132 50
Plow size...."

Sheet Iron.

		Common American and English.	R. G. American.	R. G. English.
Nos. 10 to 20	℔ ℔	3¾ @ 4c	5c	5¼c
21 to 24	"	4c	5¼c	5½c
25 to 26	"	4¼c	5½c	5¾c
27	"	4½c	5¾c	6c
28	"	4¾c	5c	6¼c

Galvanized, 14 to 20, prime,	℔ ℔ 8¼c; 2d quality ℔ ℔ 7¾c
21 to 24	" 9¼c " " 8¼c
25 to 26	" 10 c " " 9 c
27	" 10¾c " " 9¾c
28	" 11¾c " " 10¾c

Patent Polished....℔ ℔ 14c
Russia, Nos. 8 to 16...." 15½c
" Stained, No. 1...." 14½c
Belgian....10c
One piece Corrugated Sheet Iron Elbows.

CHARCOAL IRON.

4½	5	5½	6	7	Inch.
$2 50	3 50	4 50	5 25	6 50	per doz.

RUSSIA IRON.

4½	5	5½	6	7	inch.
$5 00	7 00	9 50	12 00	14 00	per doz.

COPPER—Duty. Pig, Bar and Ingot, 5c.; old copper, 4 cents ℔ ℔; Manufactured (including all articles of which copper is a component of chief value) 45 % ad valorem.
American Ingot....℔ ℔ 28¼ @ 28½c
English "....

SHEATHING, BRAZIERS COPPER, BOLTS, &C.
Braziers Copper, ordinary sizes, over 16 oz., per square foot....31c. ℔ ℔
Braziers Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot....33c. "
Braziers'Copper, 12 oz. per square foot....35c. "
Circles less than 84 inch in diameter....34c ℔ ℔
Circles, 84 inch diameter and over....37c. "
Segment and Pattern Sheets....34c. "
Locomotive Fire Box Sheets....31c. ℔ ℔
Sheathing Copper, over 12 oz. per sq. ft....30c. "
" " 12 oz. ℔ sq. ft. and lighter....35c. "
Bolt Copper....31c. "
Copper Bottoms, 33c. ℔ ℔....net
No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the square foot.

O'NEILL'S PATENT PLANISHED COPPER.
14x48.
14 and 16 oz. and heavier....37c. By the case, 36c. ℔ ℔
12 oz. and lighter....40c. " " 39c. "
Boiler Sizes.
7 in., 14x52, 8 in., 14x56, 9 in., 14x60
14 and 16 oz. and heavier....39c. By the case, 38c. ℔ ℔
(And all sizes not over 20 inches wide.)
30x60
14 and 16 oz. and heavier....41c. ℔ ℔
12 oz....44c. "

TINNING.
14x48, by the case....8c. ℔ sheet
14x48, less than case....10c. "
Other sizes not larger than 30x60....2½c. ℔ sq.
Larger than 30x60....5c. "

Brass.
Brown & Sharp's Gauge the Standard except for Fine Wire.

BRASS MANUFACTURERS' PRICE LIST.
October 27th, 1875.
Net cash prices for Roll and Sheet Brass, Wire, &c., for quantities of 100 pounds and over at one time. For less than 100 pounds, three cents additional.

HIGH BRASS
All Nos. to No. 28, and widths 14 in. and under....27c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive....30c
Over 20 in. to 30 in., inclusive....33c
½c. ℔ ℔ advance on each No. above Nos. 28 to 38, inclusive.
All Brass thinner than No. 38 is Platers' Brass, at....45c
Sheets 24x48 in. and all sheets cut to particular sizes and lengths....33c
Printers' Rules....40c
Sheets wider than 30 in and under 40 in....40c
" " " 40 in. and over....42c
Circular sheets, in diam. from 4 in. to 14. inclusive....37c
" " " over 14 " 20, "....40c
" " " " 20 " 30, "....43c
" " " " 30 " 40, "....46c
" " " " 40 in....49c

LOW BRASS.
Four cents ℔ ℔ more than High Brass.
Gilding Metal, 7c, ℔ ℔ more than High Brass.
Platers' or Gold Metal { In Bars....42c / Sawed....45c / Planed or Polished....48c

FOR SLITTING.
Metal, in width 2 in. to ⅛ in. to No. 30, inclusive, 1c. per ℔. advance.
Metal, in width 2 in. to 1 in., thinner than No. 30, 2c. per ℔. advance.
Metal, in width 1 in. to ⅛ thinner than No. 30, 3c. per ℔. advance.
Metal, in width ⅜ in. to ¼, to No. 30, 2c. per ℔. advance.
Metal, in width ⅜ in. to ¼ thinner than No. 30, 5c. advance.
Metal, ¼ in. in width and less, 10c. per lb. advance

GERMAN SILVER MARKET METAL AND WIRE

	Market Metal.	Wire.
4 per cent., 12 in., to No. 26	$0 60	$0 80
6 " " "	70	90
10 " " "	80	1 10
15 " " "	1 00	1 35
18 " " "	1 10	1 50
20 " " "	1 20	

German Silver Sheets over 12 in. wide, and weighing more than 10 ℔s., $2 per ℔., net.
Advance 2c. for each additional in., in width above 12 in., and 2c. per ℔. on each No. thinner than Nos. 26 to 36 inclusive.
All German Silver thinner than No. 36 is Platers', at 50c. per ℔. additional.
German Silver Scrap one-third less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Cop'r.
Nos. 0 to 20	0 30	0 34	0 40
Nos. 21, 22, 23	0 31	0 35	0 42
Nos. 24 and 25	0 32	0 36	0 43
Brass Rods, No. 8 and larger	0 36	0 40	0 46
Wire straightened and cut, smaller than No. 8	0 40	0 44	0 50

Fancy Wire not less than 4 cents per pound advance of Round Wire.
Spring Wire, 2 cts. per lb. advance.

FINE WIRE, BY THE OLD ENGLISH FINE WIRE GAUGE.

	High Brass.	Low Brass.	Gild'g and Cop'r.
No. 26	0 41	0 45	0 51
No. 27	0 44	0 48	0 54
No. 28	0 46	0 50	0 56
No. 29	0 48	0 52	0 58
No. 30	0 50	0 54	0 62
No. 31	0 52	0 56	0 66
No. 32	0 56	0 60	0 71
No. 33	0 60	0 64	0 81
No. 34	0 64	0 68	0 91
No. 35	0 69	0 73	1 08
No. 36	0 78	0 82	1 15
No. 37	0 98	0 98	1 28
No. 38	1 28	1 28	1 58

Ten cents per pound extra for Spooling.

TUBING.
Plain to No. 20 inclusive, above ⅜ in. to 1½ in....℔ ℔ $ 44
" 1½ to 3 in. inclusive....38
" above 3 in....50
Nos. 21, 22, 23, two cents advance on List for each Number.
Nos. 24, 25, 26, four cents advance on List for each Number.
Above No. 26, special rates.
Plain ⅜ inch....50
" 5-16 "....60
" ¼ "....80
" 3-16 "....1 20
" ⅛ "....1 60
All Mandrel Drawn Tubes, 5 cents advance on List Prices.
Fancy Tubing, 4 cents advance on List above Plain.
English, Scotch and Extra Patterns Fancy Tubing to No. 20, 9 cents above Plain.
Tubing Sawed or Cut 2 to 4 feet long, 2 cents advance on List.
Add to 2 cents ⅛ cent for each additional cutting under two feet.
All Mandrel Drawn Tubes under ⅜ in., 25 cents per pound advance

ZINC TUBING.
Plain....28
Fancy....31
Scotch and Extra Patterns....34

GERMAN SILVER TUBING.
4 Per cent....85
6 "....95
9 "....1 10
12 "....1 25
15 "....1 40
16 "....1 45
18 "....1 55
20 "....1 65

MISCELLANEOUS.
Common Plain Brass Pail Ears....39
Hose Pipes, 500 and over....71
" under 500....76
Door Rail....40

SCRAP.
High Brass Scrap, 16 cents.
Low " 18 cents.
Gilding, 20 cents.
Turnings, Filings and Chips, half the price of Scrap.
Orders for Goods on this list received on or after this date, will be filled at the rate herein stated.
Terms—Net cash. No discount allowed. Interest to be added after thirty days.

LEAD—Duty: Pig $2 per 100 lbs.; old Lead, 1½ cent per lb.; Pipe and Sheet, 2½ cents per lb.
Spanish....7c gold
German Refined....6¾c gold
English....6¾ @ 7c gold
American....6 @ 6¼c gold
Bar....dis 10 %....8¾c.
Pipe....dis 10 %....9¼c.
Tin Lined Pipe....dis 10 %....16½c.
Sheet....dis 10 %....9½c.
Shot....dis 10 % Drop, 9¾c. Buck, 10¾c.

BABBITT METAL.
N. P. U....℔ ℔ 8½ @ 9c
A., 25c.; B, 20c.; C, 15c.; D, 12c. ℔ ℔.

SOLDER....No. 1, 15c.; No. 2, 14c

STEEL—Duty: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 2¼ cents; over 7 cents, and not above 11, 3 cents per lb. over 11, 3½ cents per lb. and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.
Tool....15 @ 16c
Spring....10c
Homogeneous....12½c
Tire....12½ @ 13½c
Machinery (round and square)....10 @ 11c
File....11c
Sheet....14 @ 16c
Saw Plate, mill and mulay....14 @ 16½c
Saw Plate, gang and X cut....13 @ 14c
" circular as to size....18 @ 30c

Chrome Steel.
Tool....℔ ℔ 20 @ 21c
Tool, extra fine...." 40 @ 75c
Spring....℔ ℔ 12c and upward
Machinery....℔ ℔ 14c
Hammer...." 15c,
Gun or Homogeneous...." 16c

English Steel.—payable in gold, net.
" Best Cast....℔ ℔ 17½c
" Extra Cast...." 18½c
" Round Machinery, Cast....℔ ℔ 10½ @ 11½c
" Swaged, Cast...." 19½c
" Best Double Shear...." 17½c
" Blister, 1st quality...." 14½c
" " 2d quality...." 13 c
German Steel, Best...." 11½c
do 2d quality...." 10½c
3d quality...." 9½c
Sheet Cast Steel, 1st quality...." 17½c
" " 2d quality...." 14½c
" " 3d quality...." 12½c
File Steel, Flat and ½ Round...." 12½c
" Square and Round...." 12½c
" Mill...." 13½c
" Taper to 4 inch...." 16c
" Taper 3 and 3½ inch...." 18c

SPELTER—Duty: In Pigs, Bars and Plates, $1 50 per 100 lbs.
Silesian, cash....6¾ @ 7c., gold
American "....7½ @ 11c., currency

TIN—Duty: Plates, Sheets, Tagger and Terne, 1·1c per lb.; Electro-galvanized Plates, 2 cents per ℔; Manufactures of, not enumerated, 35 per cent. ad val. Bars, Block and Pigs, free. Banca, subject to duty of 10 per cent.
Banca....℔ ℔ 24 @ 24½c., gold
Straits....℔ ℔ 20 @ 20½c., gold
English....℔ ℔ 20 @ 20½c., gold

TIN PLATES. CURRENCY PRICES.
I C 10x14, Prime Charcoal....8 75
12x12, "....9 75
14x20, "....9 50
I X 10x14, "....11 00
12x12, "....11 50
14x20, "....12 00
D C 12½x17 "....8 25
D X 12½x17 "....10 50
For each additional X add....2 25

COKE TIN PLATE.

	Best.	2d Quality.	Ordinary.
I C 10x14	$8 50	8 00 @ 8 25	7 75 @ 8 00
I C 12x12	9 00	8 25 @ 8 50	
I C 14x20	9 25	8 50 @ 8 75	7 75 @ 8 00

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$ 8 25	7 75 @ 8 00	7 50 @ 7 75
I X 14x20	10 50		
I C 20x28	17 50	16 25 @ 16 75	15 75 @ 16 00
I X 20x28	22 50		
I C 20x200			

ZINC.—Duty: Pig or Block, $1 50 per 100 lbs. Sheet 2½c. ℔ ℔.
Sheet....cask 10¼c
"....open 10½c

Old Metals.

(Dealers' Selling Price.)

Copper		@ 20
Yellow metal	14	@ 15
Brass	13	@ 14
Heavy Composition	17	@ 18
Old lead, solid	6	@ 6¼
Tea lead		5¾
Wrought iron	1½	@
Sheet iron	0⅞	@ 0⅞
Cast iron		⅞
Machinery iron		@ 1
Zinc	5	@ 5¼
Pewter, No. 1	17	
" No. 2	10	@ 12
Spelter		@ 5

Steel.

THREE CLASS PRIZE MEDALS, CLASSES 1, 21, 22, Great Exhibition of Industry LONDON, 1851.

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1st CLASS PRIZE MEDAL, CLASS 1st UNIVERSAL EXHIBITION OF INDUSTRY PARIS, 1855.

COCKER BROTHERS,

(Limited.)

SUCCESSORS TO

SAML. COCKER & SON,

(Established 1752.)

SHEFFIELD, ENGLAND

MANUFACTURERS OF

CAST, SHEAR, SHEET AND BLISTEB STEEL, OF EVERY DESCRIPTION.
BEST CAST STEEL WIRE, ADAPTED SPECIALLY FOR MECHANICAL PURPOSES;
Also for ROPES, NEEDLES, FISH HOOKS, PINS, CRINOLINE, &c.

BEST CAST STEEL FILES, SAWS, EDGE TOOLS,
HACKLES, GILLS, CARD CLOTHING, CARD TEETH, HACKLE AND GILL PINS,
FISH HOOKS, NEEDLES, &c.

ALSO

GENERAL MERCHANTS.

WM. JESSOP & SONS,

MANUFACTURERS OF

STEEL,

AND IMPORTERS OF IRON

SHEFFIELD, ENGLAND.

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ST. LOUIS, No. 714 North Second Street.

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PHILADELPHIA, Jas. C. Hand & Co.....PROVIDENCE, Nightingale & Elton.
CHICAGO, Crerar, Adams & Co.....NEW ORLEANS, Foster & Co.
CINCINNATI, Augustus Wessel.....SAN FRANCISCO, Huntington, Hopkins & Co.

F. W. MOSS,

Successor to JOSHUA MOSS & GAMBLE BROS.

FRANKLIN WORKS, WADSLEY BRIDGE WORKS, WALKLEY WORKS, } SHEFFIELD, ENGLAND.

MANUFACTURER AND IMPORTER OF

STEEL AND FILES.

Principal Depots: 80 John St., N. Y., and 512 Commerce St., Phila.

MOSS & GAMBLE **SUPERIOR C. S. "FULL WEIGHT" FILES,**

Cast Steel Hammers and Sledges. Also, "M. & G." Anvils and Vises.

WARRANTED CAST STEEL, especially adapted for DIES and TURNING TOOLS, DRILLS, COLD CHISELS, PUNCHES and all kinds of MACHINISTS' TOOLS.
Celebrated Improved Mild Centre Cast Steel, for Taps, Reamers, and Milling Tools, warranted not to crack in hardening Taps of any size.
Swedes Spring Steel, especially adapted to Locomotive and Railway Car Springs.
English Spring and Plow Plate Steel. Also, manufacturer of

Sheet Cast Steel Shear, German, Round Machinery, Hammer, Fork and Shovel Steel

And GENERAL MERCHANT.

A. M. F. WATSON, General Agent.

WILSON HAWKSWORTH, ELLISON & CO.,

Vienna Universal Exhibition, 1873.

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W. H., E. & CO. have pleasure in announcing the Award of the MEDAL FOR MERIT for their Exhibit of Crucible Cast Steel, Files, Steel Wire, Tools, &c. This is the ONLY Award to any Exhibitor of STEEL WIRE in the British Section.

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Steel Wire, &c., AND GENERAL MERCHANTS.

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Isaac Jenks & Sons,

MINERVA AND BEAVER WORKS, WOLVERHAMPTON, ENGLAND.

MANUFACTURERS OF

JENKS" SPRING STEEL, "MINERVA" SWEDES, AND "ANGLO" CAST SPRING STEEL;
"JENKS" TIRE, TOE CORK, SLEIGH SHOE, BLISTER, AND PLOW STEEL;

ALSO,

"BEAVER" PLOW, TIRE, AXE, AND SHEET IRON.

VAN WART & McCOY, Agents, 134 & 136 Duane Street, N. Y.

J. & RILEY CARR,

MANUFACTURERS OF SUPERIOR

STEEL

For Tools, Cutlery, Saws, Files, Augers, Gimblets, &c.; Sheet Cast Steel for SPRINGS AND STAMPING COLD;

ALSO THE CELEBRATED

DOG BRAND FILES,

Unsurpassed, if equaled in quality.

Riley Lane Works, Sheffield, England.

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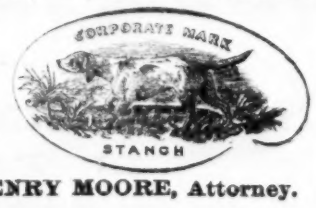
Established 1810.



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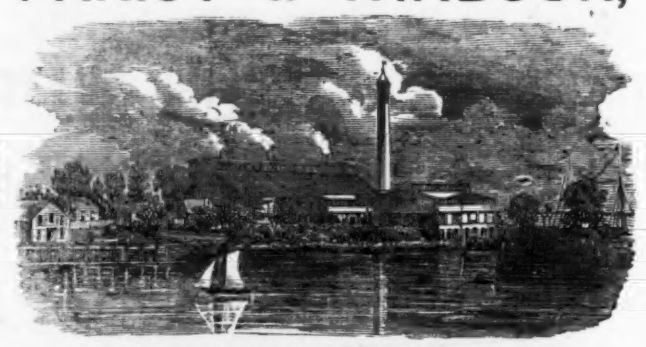

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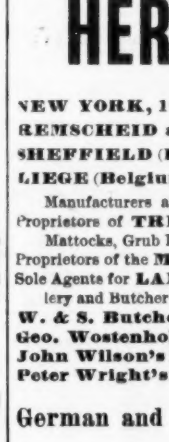

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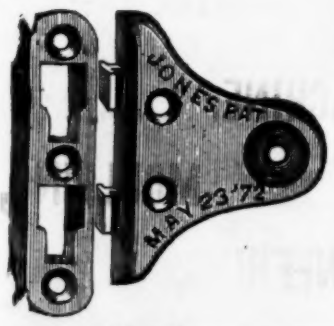

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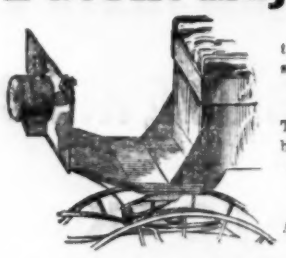

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Casters.—Iron Bed.....dis 30&10 @ 40 %
Porcelain Wheel Bed.....dis 40&10 @ 50 %
Iron and Brass Wheel Plate.....dis 40 @ 40&10 %
Porcelain Wheel.....dis 50 @ 50&10 %
Clothes Wringers.—Universal.....per doz $72 00
Novelty..... " 72 00
Discount on 2 dozen lots. $3 per dozen.
Coffee Mills.—Common Box and Side.....dis 15 %
Patent Box and Side.....dis 15 %
Cutlery.—American Pocket (best).....dis 25 %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices.
Drawing Knives.—Hart Mfg. Co.'s.....dis 60 %
Adjustable Handle.....dis 10 @ 15 %
Beatty.....dis 15 @ 20 %
Fry Pans.
Tinned.....dis 40 @ 45 %
₱ doz..$3·50 4 00 4·50 5·00 5·50 6·50 7·50 9·00 10·00
No..... 0 1 2 3 4 5 6 7 8
Burnished.....dis 40 @ 45 %
₱ doz..$3·00 3·75 4·25 4·75 5·25 6·00 7·00 8·00 9·00
No.... 0 1 2 3 4 5 6 7 8
Files.
Nicholson Mill Files.....new list
" Bastard.....
" Taper.....
Butcher's Mill (Advanced March 8th)...$4 75 to £ gold
" Bastard..... 4 75 to £ gold
" Taper..... 4 75 to £ gold
Fluting Machines.
K. F. M.—4¼ in. rolls, $5·50.....dis 15 %
" —6 in. rolls, $6·50.....dis 15 %
Mrs. Knox—4 in. rolls, $5·25.....dis 20 %
" —6 in. rolls, 7·00.....dis 40 %
Hammers.
Yerkes & Plumb's.....dis 15 %
Hammond & Son's.....dis 15 %
Veree.....dis 20 %
Hatchets.
Beatty's.....dis 15 @ 20 %
Shingling and Half. { ₱ doz...$7·00 7·50 7·75 8·00
{ No..... 1 2 3
Yerkes & Plumb.....dis 15 %
Shingling and Half. { ₱ doz...$7·00 7·50 8·00 9·50
{ No..... 1 2 3 4
Claw.... { ₱ doz.....$7·50 8·00
{ No..... 1 2 3
Hinges.
Strap and T. (Changed March 24).....dis 45 %
Horse Nails. Nos. 6 7 8 9 10
Ansable..... 21 23 24 23 22
Globe..... 28 26 25 24 23
Brundage..... 26 24 23 22 21
Nos. 5 6 7 8 9
Putnam..... 32 28 26 25 24 23
On Aussible, Globe and Brundage 1000 ℔ lots....dis 5 %
Knobs.—Door, Mortise and Rim.
Makes in Combination.....new list dis 45&5 %
Extra discount for cash 2 %
Mineral and Rim.....dis 5 %
Locks and Latches.—Rim and Mortise.....dis 40 %
Extra discount for cash 2 %
Till and Cupboard.....dis 25 %
American Padlocks.....dis 0 %
Extra discount for cash 2 %
Scandinavian Pad Locks.
₱ doz.....$10·50 10·50 12·00 12·00 15·00 15·00 } dis
No..... 59 59½ 60 60½ 61 61½ } 5%
₱ doz..... $16·00 18·00 22·00 22·00 }
No..... 63 63½ 63 63½ } dis 25
Trunk Locks......dis 5 @ 10 %
Thumb and Rotgens Latches.....dis 25 %
Lanterns.—Square Candle and Oil.....dis 10 %
Globe for Oil.....dis 10 %
" Kerosene.....dis 10 %
Tubular Lanterns.....dis 10 %
Mattocks.—Long and Short Cutter.....dis 25 %
Western Pattern.....dis 25 %
Pennsylvania Pattern.....dis 15 %
Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20 %
Stebbins' Gates.....dis 62½ @ 62½&10 %
Lincoln's " .....dis 40&10 @ 50 %
Landers, Frary & Clark's Petroleum.....dis 15&10 %
Taylor's Petroleum Faucets.....dis 20&10 %
Brass Liquor Cocks.....dis 20&10 %
Meat Cutters.—Dixon's.....dis 20 %
Woodruff.....dis 20 %
Stowe.....dis 20 %
Hale's.....dis 35 %
Stuffers.....dis 20 %
Planes.—Auburn Tool Co.. "Bench".....dis 40 %
Second Quality.....dis 50 %
Metallic Plane Co.....dis 25&5 %
Evans Pat. Circular.....net
Plumbs and Levels.
Adjustable.....dis 60&10 %
Non-Adjustable.....dis 60, 10&10 %
Plane Irons.—American.....list net
Butcher's.....gold £, $5 50
Picks.—Philadelphia.....net
Pittsburgh.....net
Rules.....dis 60&10 %
Rakes.—Cast Steel Garden.....dis 40 @ 40&5 %
Malleable Garden.....dis 40 @ 40&5 %
Wood Head Iron Teeth.....dis 40 %
Steelyards.—American Pattern.....dis 15 %
₱ doz....$5·50 7·00 9·00 10·00 11·00 12·00
No..... 50 100 150 200 250 300
English Pattern.....dis 15 %
₱ doz.....$7·00 8·67 10·67 12·67 14·67 16·67
No..... 50 100 150 200 250 300
Hart's Pattern.....dis 50 %
₱ doz.....$14·30 17·75 21·00 25·50 31·00 35·50
No..... 50 100 150 200 250 300
Scythes.—Golden Clipper, Damascus Blade. Boxed and Sharpened.....₱ doz. $10·00 net
Golden Clipper No. 10, Boxed and Sharpened.....₱ doz $9·75 net
Green Clipper No. 5, Boxed and Sharpened.....₱ doz $9·50 net
Common Scythes.....₱ doz $7·50 @ 9·00
Squares.—Steel and iron, new list.....dis 50 %
Saws.—Disston's Cross Cut.....dis 15 %
Disston's Hand.....dis 12½ %
W. McNiece a H'd. Cross-Cut & Circ'r, new list..dis 15 %
Boynton's Lightning, new list.....dis 40 %
" Champion.....dis 45 %
Shovels and Spades.
Rowland's Plain Back, Jan. 23d.....dis 40 %
" Back Strap " .....dis 40 %
Oliver Ames & Sons.....dis 20 %
Brady Shovel Co.....dis 20&5 %
Sad Irons.—Richmond (polished face).....per lb. 3½c
Richmond (polished face)..... by the case " 3¼c
Stone.—Arkansas Oil, No. 1.....₱ ℔ $
Turkey Oil, No. 1..... "
Washita Extra..... net " 35c
" No. 1..... net " 30c
" " 2..... net " 25c
..... " 5½c

Screws.—Iron.....new list, Sept. 1st, 1875. dis 30 %
brass.....dis 30 %
Spoons.—
Plated.....dis 40&10 @ 50 %
Britannia, Boardmans (new list).....dis 50&10 %
" Parkers (old list).....dis 50 @ 50&10 %
German Silver.....dis 30 %
" Light.....new list dis 35 %
Lalance & Grosjean Iron.....dis 10 %
Springs.—Gray's Door.....dis 60&10 %
Torry's Door.....dis 60&10%
Stocks and Dies......dis 10&5 %
Stove Polish.—Gem.....₱ gross, $6·00
Onyx..... " $3·00
Try Squares.—Winterbottom.....dis 10 @ 15 %
Stanley Rule and Level Co.....dis 45&10 %
Willis Thrall, No. 2.....dis 50&10 %
Disston's No. 2.....dis 40 %
Tacks, &c.—Half Weight Tacks.....dis 72½ %
" " by the case...dis 72½&7½ %
Clout and Finishing Nails.....7½ %
" " by the case.....dis 7½ %
Traps.—Genuine Oneida—Newhouse list.....dis 20 %
Imitation " " .....dis 30 %
Vises.—Solid Box, currency..... ₱ ℔ net 14c
Wrenches.—Coes Genuine.....dis 10 @ 40&5 %
Coes Imitation Wrought Bar.....dis 50&10 %
" " Malleable Bar.....dis 60&10 %
" " (Kellogg) Malleable Bar.....dis 65&10 %
Tafts Pattern (Wrought Bar).....dis 70 @ 70&10 %
Philadelphia Tool Co.'s Pat. Duplex.....dis 25 %
" " " Improved Baxter.....dis 25 %
" " " Adjustable Fork.....dis 25 %
Wire.—No. 0 to 18.....(Advanced April 24th)..dis 42½ %
No. 19 to 26..... " " ..dis 47½ %
No. 27 to 36..... " " ..dis 55¼ %
Coppered 0 to 12.....dis 15 @ 20 %
Tinned Broom Wire.....dis 35 %
Galvanized Wire No. 1 to 18.....dis 40 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.
November 6, 1875.

Augers—Snell Mfg. Co.....dis 25 %
Axes—Francis.....
Bits, Auger—Snell Mfg. Co.....dis 25 %
Phœnix.....dis 40 %
Bells, Cow—Ives & Genuine.....dis 35 %
Braces—Bit, Spofford's Patent.....dis 50 %
Brads, Cut.....dis 50&7½ %
Boards—Stove, Brooks' Pat.dis 35 % 4 mos.; 35&5 % 90 dys
Belting—Rubber.....dis 30 @ 10 %
" Leather, new list, oak tanned.....dis 30 %
Brick—Bath (box of 2 doz) Best English.....$1·25
" Rutherford " " .....$1·00
Can Openers—Sprague's.....dis 50 %
Cases—Parlor Coal Hod.....dis 15 %
Chalk—White, Carpenter's 90c
Red, Carpenter's .....gross, 57c
Chisels—Firmer Socket.....dis 60, 10&10 %
Framing Socket.....dis 60, 10&10 %
Corner Socket Chisels.....dis 60, 10&10 %
Slick's Carpenters'.....dis 60, 10&10 %
Castings—Malleable .....₱ ℔ 9¾c
Cutters—Meat, "Hales".....
Egg Beaters—" Peerless".....35 %
"Centripetal".....per doz $3·00
Elbows—Corrugated.....per doz 5·00
Adjustable.....dis 10 %
Files—Maleschoss Bros.....dis 20 %
Fluters—Geneva Hand.....dis 50 %
Freezers Ice Cream—" Champion .....₱ doz. $15·00
Hammers—Henry W. Kip's.....dis 33⅓ %
Hinges, Gate—Shepard's.....dis 10 %
Hinges—Window Blind—.....dis 30&10 %
Shepard's and Standard.....dis 60, 10&5 %
Hods, Coal—Plain, Black and Galvan'd...new list dis 15 %
Funnel, Black and Galvanized..... " dis 15 %
Fancy and Helmet..... " dis 15 %
Sad Irons.....3½c
Kettles—Brass.....₱ ℔ 45c
Copper, "Hand Made".....38c. @ 40c.
Enameled.....dis 50&10 %
Knives, Drawing—Oval No. 1.....dis 60, 10&10 %
Razor Blade.....
Lanterns "Peerless. No. 1 5 10
₱ doz $25 00 $10 50 $13 75 dis 10 %
Tubular.....$11 00
" with Guards.....11·50
Machines—Apple Paring, "Keystone".....7·75 ₱ doz
Machines—Boring, Snell's.....dis 20 %
Mills, Coffee—Box and Side, common.....dis 15 %
Box Union and Eagle.....dis 15 %
"American.....dis 20 %
Molasses Gates—"Self Measuring".....dis 20 %
Nails—Clout and Finishing.....dis 20 %
Shoe.....dis 7½ %
Cut, "Chesapeake," Ltd.....dis 7½ %
Horse, Ausable.....No. 5 7 8 9 10
30 27 25 24 23 22c
" " Pointed & Polished.....add 1c ₱ ℔
" " 1000 lbs.....dis 5 %
" Clinton.....No. 5 7 8 9 10
21 19 18 17 16c
Packing—Rubber.....dis 30 @ 10 %
Paint—White Lead, U. S. Gov't.....₱ ℔ 5¾c
Pans—Dripping.....₱ ℔ 10c
Rivets—Iron, Black and Tinned.....dis 25&7½ %
Screws—"American Screw Co"—
Flat Head, Iron.....dis 35 %
Flat Head, Brass.....dis 30 %
Sieves—Wood, Hoop Iron.....$1·35
Tinned.....1 75
Skates and Straps—White's.....dis 30 %
Spoons, Iron Tinned.....dis 10 %
" by the case.....dis 10 %
Plated Rogers' A No. 1.....dis 50 %
Britannia.....dis 50&10 %
G. S. Hall, Elton & Co.....dis 30&5 %
Squares—Steel and Iron.....new list 50 %
Scales—Buffalo Scale Works.....dis 25 %
Fairbanks.....dis 15 %
Stove Polish—Gem.....₱ gross, $4·50
" Dixon's.....6·00
Tacks—Half Weight Am. Iron.....dis 72½&7½ %
Tea Trays.....dis. 15 %
Tools—Machinists' and Tinmens'.....dis 10 %
Vases—Palace Coal.....dis 15 %
Vises—
Parallel, Buffalo...Old pattern, dis. 30%; new, do.dis 20 %
Ware—French, Tinned and Iron.....dis 20&10 %
Stamped and Japanned.....dis 10 %
Cast Iron Hollow.....dis 40 %
Wire—Besemer Steel.....dis 10 %

Tin Plates.—Add for each X.
10x14, IC. Charcoal... 89·50 | 14x20 C. terne..... $8·75
12x12, " ... 10·00 | 20x28 C. " 19 50
12½x17, " ... 9·00 | 20x28 X. " ..... 24·00
14x20, " ... 10·50 |

Pig Tin—Straits..... 26c @ 26c
Bar Tin..... 27c
Solder—No. 1, Crook's..... 18 c
Sheet Zinc—
"Lasalle".....570 ℔ casks 100 ℔ casks
$10·50 10·80 ₱ 100 lbs
Sheets.....$10·50
Babbitt Metal.....₱ ℔ 12c
Iron Wire—Bright and Annealed.....dis 45 %
Coppered.....dis 40 %
Tinned.....dis 25 %
Tinned Broom, { Nos. 20 21 22 } .....dis 35 %
{ 20c 21c 21c }
Copper—Sheathing 14 @ 18 oz.....₱ ℔ 30c
Planished.....₱ ℔ 37c @ 38c
Bottoms.....₱ ℔ 32c
Bolts.....₱ ℔ 31 @ 35c
Braziers' Sheets.....₱ ℔ 31 @ 33c
Sheet Iron.—
18 Compon.....$4 05
24 Common.....4 25
26 Common.....4·45
24 W. D. Wood & Co., Smooth Finish.....
Planished..... A. B.
14c 11c
Gen. Russia, No. 1 stained.....16c
" " clean.....15c
Galvanized.....dis 33⅓ %

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers Metals, No. 214, 216 and 218 Main street.
November 1, 1875.

Tin Plate.—I. C. 10x14 Charcoal..... ₱ 50 @ 10·00
I. X. 10x14 Charcoal..... 12 00 @ 12·50
I. C. Terne 14x20..... 8·75 @ 9 00
I. C. Terne 20x28..... 20·50 @ 21·00
I. C. 20 inches Continuous..... 21·00
Block Tin.—
Pig.....₱ ℔ 25c
Bars.....₱ ℔ 26c
Solder.—
A 1.....₱ ℔ 16c
Roofing.....₱ ℔ 17c
S. & Co.....₱ ℔ 19c
Lead.—Pig.....₱ ℔ 7¼c.
Bar.....₱ ℔ 8½c
Copper.—
Ingot.....₱ ℔ @ 24c
Planished..... " @ 38c
Sheathing..... " @ 31c
Copper Drops..... " @ 34c
Sheets...6 to 7 lb..... " @ 37c
" 8 to 9 lb..... " @ 35c
" 10 to 12 lb..... " @ 33c
" 13 lb. up..... " @ 31c
Copper Bottoms..... " @ 33c
Zinc. Cask. 500 to 1000 lbs.....₱ ℔ 10½ @ 10¾
Case, 100 lbs..... " 10¾ @ 11 c
Slab..... 7¾c
Brass.—Roll, No. 6 to 30.....₱ ℔ 30c
Roll, No. 30 to 36..... " 35c
Wire, No. 0 to 20..... " 35c
" 20 to 25..... " 40c
Babbit Metal.—Sellew & Co..... " 30c
Aliens'..... " 30c
Market..... " 12c
Antimony.....₱ ℔ 17c
Bismuth.....₱ ℔ $4 00
Nickel.....₱ ℔ $3 50
Russia Iron.—Bundle.....₱ ℔ 16c
Less than bundle.....₱ ℔ 16c @ 18c
No. Stained.....
Sheet Iron.

	Com. B.	Smooth Fin. S. L. U.	Smooth D Re'd.
15 to 20	4c	5·10c	7·10
22 to 24	4·20c	5·30c	6·90
26	4c	5·50c	7·05
27	4·20c	5½c	7¼
30	5½c		

Galvanized Iron.—Full bundles.....dis 30 %
Nos. 18 to 20.....12c | No. 26.....15c
22 to 24.....13c | 27.....15c
Bar Steel.—Silver, ₱ ℔ 16c Crescent, 21c.
Iron Wire.....dis 35 %
Enameled Ware.....dis 50 %

One Piece Corrugated Elbows.....dis 10 %

Charcoal Iron.		Russia Iron.	
4¾ inch.....	₱ doz $2·50	4¾ inch.....	₱ doz $5·00
5 "	" 2·50	5 "	" 7·00
5½ "	" 4·50	5½ "	" 7·50
6 "	" 5·50	6 "	" 12·00
7 "	" 6·50	7 "	" 14·00

Leader Elbows, Flat Crimp Retinned or Galvanized.—Dis. 10 %

	₱ doz.		₱ doz.
2 inch.....	$1 75	2½-inch.....	$2 75
3-inch.....	2 25	3½-inch.....	3 25
4-inch.....	2 50	4½-inch.....	3 50

Sheet Iron Bread Pans.....₱ ℔ 8½c
American Broilers.....₱ doz. $3·50
Tiumen's Machines.....dis 5 %
Sad Irons.—I X L's.....₱ ℔, 3½c
Brass Kettles.—Ansonia.....45c
Dog Irons.....8 c

PITTSBURGH.

The following are the Card rates of Lewis, Oliver & Phillips, H. B. Newhall, 11 Warren St., New York, Agent. Iron, standard list assorted sizes, for large orders, specifications to include Bands, small Rounds and Ovals, 2½c. rate, 2 % off net.
Flat Rail (1¼x¼), punched and coun'sunk..4½c ₱ ℔ net
Iron Wedges.....4½c ₱ ℔ net
Norway Nail Rods.....8½c ₱ ℔ net
Crow Bars (in ordering please state whether "Wedge" or "Pinch" point).....4½c ₱ ℔ net
Beetle Rings.....8 c ₱ ℔ net
Fence Pickets—
¾ round, bent to shape, 25c ₱ ft. of fence, less 15 % off net.

Discount off Standard List.

Carriage and Tire Bolts.....75 % off net
Carriage and Tire Bolts delivered on cars or boats in Pittsburgh.
Stove Bolts.....20 % off net
Machine and Square Head Bolts.....40&10 % off net
Coach and Lag Screws.....40&10 % off net
Bolt Ends.....40 % off net
Pat. Hot Pressed Square and Hexagon Nuts, small sizes, from 3-16 to ⅜ in.....8¼c ₱ ℔ off net
Pat. Hot Pressed Square and Hexagon Nuts, large sizes, from 7-16 to 2 in.....6¾c ₱ ℔ off net
Washers, all made from new band iron, small sizes, from 3-16 to ⅜ in.....9¼c ₱ ℔ off net
Washers, all made from new band iron, large sizes, from 7-16 to 1¾ in.....7¼c ₱ ℔ off net
Nuts and Washers in 25 lb. boxes, ½c ₱ ℔ ex. Nuts and Washers in lots less than one keg each size, ½c ₱ ℔ ex. Nuts and Washers in 5 lb. boxes, 1c. ₱ ℔ ex. net prices.
Standard Cape, for Plows.....8¾c. ₱ ℔ net
Iron Harrow Teeth, in lots of 1 ton or more, packed in 200 lb. boxes, 1 in. diam. 3¼c ₱ ℔ net; ¾ ⅝ in. diam. 3½c ₱ ℔ net; ⅝ in. diam. 3¾c ₱ ℔ net.
Patent Headed Harrow Teeth, packed in boxes ½c ₱ ℔ ex
Skein Bolts, in bulk, in lots of 1 keg or more, ⅝ in. diam. 5c ₱ ℔ net; 9-16 in. diam. 6c ₱ ℔ net; ½ in. diam. 7c ₱ ℔ net. 1c ₱ ℔ extra when less than 1 keg of each size is ordered.
Strap & T Hinges..25¾&10 % off net, delivery as cust'ry
Screw Hitching Rings.....$5 25 ₱ 100 net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long..... ₱ ℔ 3¾c net
1 to 2 in. diam. from 4 to 8 ft. long..... " 4 c net
1 to 2 in. diam. from 1½ to 4 ft. long..... " 4¼c net
⅞, ¾ and ⅝ in. diam. over 4 ft. long..... " 4½c net
⅞, ¾ and ⅝ in. diam. from 1½ to 4 ft. long " 5 c net
Bridge bolts with upset ends.....½c. ₱ ℔ extra
Wrought iron plates, punched.....4¼c. ₱ ℔ net
Cast Iron Washers.....₱ ℔ 3¼c net
Duck Nest Tuyere Irons.....$14 50 ₱ doz net

WAGON HARDWARE.

Wagon Box Strap Bolts—
10 in. long by 7-16 at Screw End, ₱ set of 8 bolts.. 45c
12 " ½ " " 8 " .. 55c
10 " 9-16 " " 8 " .. 65c
12 " 9-16 " " 8 " .. 70c
14 " 9-16 " " 8 " .. 80c
10 " ⅝ " " 8 " .. 80c
12 " ⅝ " " 8 " .. 80c
14 " ⅝ " " 8 " .. 90c
16 " ⅝ " " 8 " .. 1 00
18 " ⅝ " " 8 " .. 1 10
20 " ⅝ " " 8 " .. 1 20
5c ₱ set for each additional inch over 14 in made. All lengths
In ordering Box Strap Bolts please give diameter at Screw End.
Wagon Box Rods, narrow track, each.....15c
" " wide track, each.....17c
Single Tree Irons, ₱ set of four pieces.....8c
Wrought Iron Bolster Plates, 2¾ in. wide, ₱ set.....45c
" " 3 " " 50c
" " 3¼ " " 55c
" " 3½ " " 60c
Wagon Brake Ratchets, each.....14 c
" " finished with guard, each..40 c
Wrought Hammer Straps, heavy pattern, each..18 c
" " light " each.....12 c
" Rub Irons, each.....9 c
Stay Chain Hooks, each.....5½c
Double and Single Tree Clips, figure 1, each.....8 c
" " " 2, each.....9 c
" " " 3, each.....11 c
Axle Clips, Round Part ⅝, Flat Part 1¼, each.....8c
Wagon Clevis, including Pin, complete, each.....10c
Pole Caps, each.....2½c
Single Tree Hooks, Nos. 1 and 2.....4½c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks, Clevis and Pin, Clips, Single Tree Hooks, and Pole Caps, in lots of 50 sets.....dis 15 %
Wagon Box Staples, 1¼ to 2¼ in. to clinch. ₱ 1000 $11 00 net
" " " Bevel Box Iron, to rivet on. ₱ 1000 7 50 net
Neck Yoke Eyes, each.....4¼c net
" " with ⅝ rings, each.....7½c net
King Bolts, ⅝, 1, 1¼, and 1¼ in. diam.....₱ ℔ 4½c net
Wagon Rivets, ex. large, flat, oval and steeple head, ¼ in. diam. all lengths..... " 8¼c net
Wagon Rivets, 3-16 in. diam., all lengths..... " 9¼c net
" " ¾ to 1 inch long..... ₱ ℔ 1c extra
" " & Nails, in 5 ℔ paper boxes..... " 1c extra
" " in 25 ℔ wood " ..... " ¼c extra
Wagon and Hinge Nails, ¼ in..... ₱ ℔ 17 c net
" " " 3-16 in..... " 19 c net
Wagon Rivets and Nails, in less lots than one keg each size..... " ½c extra
Double Tree Plates..... " 5c net
Coupling " ..... " 5c net
Tongue " ..... " 8¼c net
Neck Yoke Plates..... " 10½c net
Tongue Cap Iron, 1¾, 2 & 2¼ in. wide, same price ₱ ℔ as Band Iron.
Wagon Chains, Stay, Lock and Tongue, 5-16 in. ₱ ℔ 10½c net. ¼ in., 11½c. net
Above prices are free on board cars in Pittsburgh. Subject to change of market, without notice.

DETROIT.

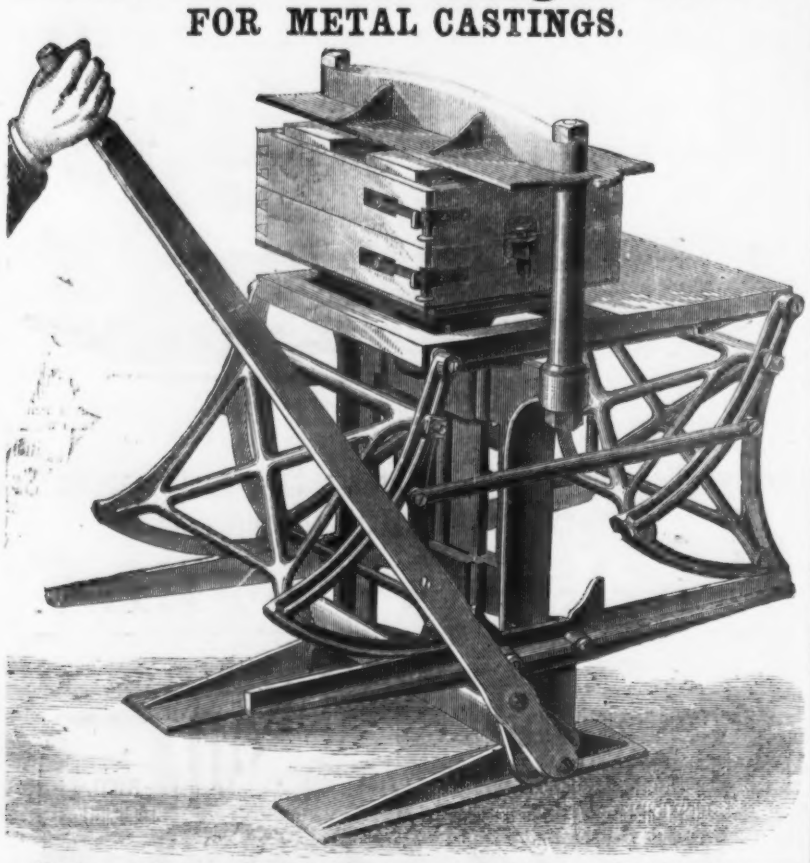
(Reported by Messrs. Jewett & Root.)
Nov. 8, 1875.

Tin Plate.—Best Charcoal
IC, 10x14.....$ 9 75
IX, 10x14..... 12 25
XX, 10x14..... 14 75
IC, 12x12..... 10 25
IX, 12x12..... 12 75
IC, 14x20..... 10 75
IX, 14x20..... 13 25
XX, 14x20..... 15 75
XXX, 14x20..... 20 75
DC, 100 Plate..... 9 25
DX, " 11 75
DXX, " 14 25
DXXX " 16 75
DXXXX 100 Plate.. 19 25
IX, 14x14..... 19 25
IC, 10x14 W..... 9 25
IX, 10x14 W..... 11 75
Roofing Tin.—Best Char.
IC, Terne, 14x20...$ 9 00
IX, " 14x20..... 11 50
IC, Terne, 20x28..... 19 00
IX, " 20x28..... 24 00
Coke Tin.—
IC, 10x14 Coke.....$ 9 00
IX, 10x14, Coke 11 50
IC, 14x20, " 10 00
Solder.—No. 1..... 16c
No. 2..... 15c

Pig Tin.—
Large Pigs.....24c
Small Pigs.....25c
Bars.....26c
Bright Wire.
65 lbs. in bdl.....dis —
Copper.—
Sheathing.....31c
Copper Bottoms.....32c
Planished Copper.—
Sheathing, 14x48.....38c
Boiler Size, No. 7.....40c
" " No. 8. ...40c
" " No. 9 ...40c
Sheet Iron.—
No. 18 Am. Com.....4 00
No. 24 Am. Com.....4 20
No. 26 Am. Com.....4 40
No. 27, Am. Com 4 60
W. D. WOOD'S & CO.'S SHEET IRON.—
Nos. 15 to 20 Smooth $5 00
" 21 to 24..... 5 20
" 25 & 26..... 5 40
" 21 to 24 Char'l.. 6 70
" 25 & 26 " .. 6 90
RUSSIA.
Genuine.....17c
Imitation.....14c

Eames' Pat. Molding Machine

FOR METAL CASTINGS.



The above machines have recently been introduced in several large iron foundries in this country, where they have given entire satisfaction. Among the advantages are :

1st. A great saving in the cost of producing castings.

2d. A man can learn to mold with the machine in less than 30 days' time.

3d. The castings produced will be found more perfect, less poor work, and more uniform than if molded by the old method.

The machine is adapted for either Iron or Brass Castings. *Price Reduced.* For further particulars, send for Circular. Address,

P. & F. CORBIN,

EXCLUSIVE LICENSES,

Also Manufacturers of *Architectural Bronze Work, Locks, Hinges and fine Builders' Hardware generally.*

New Britain, Conn. New York, 87 Chambers St.

Ewart's Detachable Drive Chain.

PAT-D.

Positive transmission without stretch ; runs quietly and is frictionless ; better than Belts for all exposed or irregular work, or for the attachment of slats or buckets, and for Transferring Power generally.

Address, W. D. EWART,

Care CHICAGO MALLEABLE IRON CO., No. 116 Lake Street, Chicago, Ills.

THE HULL & BELDEN CO.,

DANBURY, CONN.

Wrought Iron & Steel

Drop Forgings,

FINE AND CLOSE WORK FOR

Guns, Pistols, Sewing Machines and other fine Tools and Machines, Wrenches,

CLAMP & THUMB SCREWS, CARRIAGE IRONS, AGRICULTURAL & OTHER IMPLEMENTS, &c., &c., at reasonable prices.

IN STOCK,

Machine Handles,

(SEVEN SIZES)

Both Finished & Rough.

CENTENNIAL

SELF-LUBRICATIVE

Hemp Piston Packing

FOR

Locomotives, Steamships, Stationary Engines, Hot or Cold Water Pumps.

Recommended by Master Mechanics and Engineers, as the cheapest and best in market. **No more Extortionate Prices. No more Fluted Rods**—but a good article at fair price.

JOHN CANFIELD & CO.,

SOLE MANUFACTURERS,

Office, 1321 Fairmount Ave., Phila.

PATENT APPLIED FOR. Send for Circular.

GOLD MEDAL

Non-Extensible Razor Belt.

PATENTED JULY 25, 1871.

RE-ISSUED MAY 13, 1873, and JUNE 9, 1874.

In this Strap the liability of the leather to stretch and become loose and porous is prevented by the a patented non-extensible base, which supports the leather and secures

PERMANENT ELASTICITY.

We make this style with single rod, double rod, and wood frames, and intend that it shall, in quality compare favorably with our other well known brands.

BENJAMIN F. BADGER, Manufacturer,

Badger Place, Charlestown, Mass.

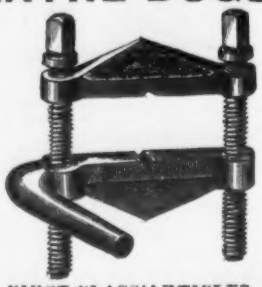
BILLINGS & SPENCER CO.

MANUFACTURERS OF

CLAMP, DIE AND COMMON

LATHE DOGS.

Vienna, 1873.



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DROP FORGINGS.

For Machine Handles, Lathe Wrenches, Spinning Rings, Marlin Spikes. Clinch Rings, Thumb Screws. Thumb Nuts, and Parts of Drill Chucks, Sewing Machines. Guns, Pistols, and

Machinery Generally.

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Patent Self-Adjusting PIPE WRENCHES, of all sizes.

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Woonsocket, - - RHODE ISLAND.

Sole Manufacturers of the celebrated

Diamond Solid Emery Wheel

Prices: 10x1, $2·90 ; 14x2, $9·75 ; 18x2½, $20·00 ; 24x3, $42·00.

All other sizes at proportionate prices. State diameter of Holes in your orders for Wheels.

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And Automatic Knife Grinders

For the rapid and perfect grinding of Planer, Paper Cutting, Leather Splitting and other long Knives.

These goods are unsurpassed for elegance of design, workmanship, capacity and durability. First premium awarded by American Institute, N. Y., 1870 and '73 ; Medal and Diploma by M. C. M. A., Boston, 1874.

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Manufacturers of Latest Improved Machine Tools, Rotary Shapers, two sizes, Iron Planers, all sizes, Horizontal Drill Attachments, for upright power drills, Self-feeding Portable Drills, hand or power, Expansion Boring Bars, five sizes, Universal Slide Rest, for taper work, Twist Drill Sharpening Machines, automatic and adjustable in every direction, Noiseless Friction Gears, for transmitting up to thirty horse-power.

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PHILADELPHIA.

JAMES MOORE,

(Successor to MATTHEWS & MOORE,)

Engineer, Machinist, Founder and Boilermaker

CASTINGS of every description.

ROLLING MILL AND FURNACE EQUIPMENTS COMPLETE

Rolls Turned for Rails, Beams, Angles, and all shapes for Iron, Steel, or Composition Metals.

Sugar Mill, Saw Mill and Grist Mill Machinery,

AND MILLWRIGHTING IN GENERAL.

BOILERS---FLUE, TUBULAR AND CYLINDER, and all kinds of

TANK AND PLATE IRON WORK.

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Manufacturer and Patentee of

UPRIGHT ROTARY

Knitting Machines,

Cone Winders for Hosiery Yarns,

NAPPERS FOR HOSIERY GOODS,

Stop Motions & Alarms for Knitting Machines,

Flock Cutters, and Flock Renovators.

EXTRA PARTS FURNISHED PROMPTLY.

☞ I am also prepared to furnish anything in the line of Gear Cutting from 5½ feet to ¼ of an inch in diameter, any shape of tooth desired; Racks, Worms, Worm Wheels, Screws any size or number of threads to the inch, Wood Planing, Iron Planing, Large Lathe Work, Gear Cogging, Shafts, Hangings and Pulleys, also all kinds of Mill Work, Jobbing, and Machinery in general.

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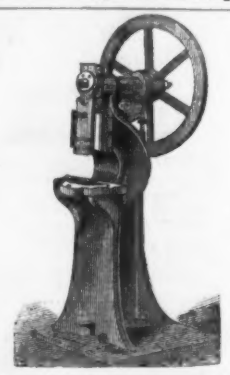
Particular attention paid to Experimental Machinery. We aim to maintain our reputation for doing work well.



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Manufactured by

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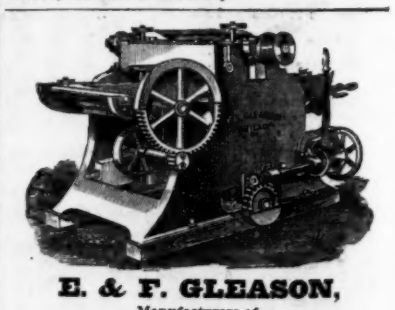

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For Hotels & Stores a specialty.

Machinery in General made to order.

BOSTON.

(Reported by Macomber, Bigelow & Dowse, 156 to 164 Oliver St.)

Augers.—Watrous Ship....dis 10 %
L'Hommedieu Ship....dis 15 %
Axes.—Forester's Favorite, Bronzed....$11 50
Blue Jackets, Blue....11 00
Excelsior, Black....10 50
Chopper's Pride, Bronzed....10 50
Red Cross, Red....9 00
Red Cross, Handled....12 00
Boy's Handled Blue Jackets....11 00
Axe Handles.—Wadleigh's Oak—
A (Extra) $2·50. B (No. 1) $2·00. C (No. 2) $1·50 ₩ doz
Bells, Sleigh—
Fancy Body, Patent Leather, Cloth Bound, White Metal, 30, No. 1....$1·70
Fancy Body, Patent Leather, Cloth Bound, White Metal, 36, No. 1....1·80
Fancy Body, Patent Leather, Leather Bound, Extra Tinned, 30, No. 1....·38
Fancy Body, Patent Leather, Leather Bound, Extra Tinned, 36, No. 1....2·50
Fancy Body, Patent Leather, Leather Bound, Silver Plated, 30, No. 1....3·38
Fancy Body, Patent Leather, Leather Bound, Silver Plated, 36, No. 1....3·50
Shaft, Strap, White Metal, House Bells, extra, 6, No. 1....per pair, 60c.
Common, 6, No. 1.... " 45c.
Blind Hinges.—
Orr or Washburn's....per hundred sets $9 50
Blind Fasts.—
Orr or Washburn's....per hundred set $6 00
Bolts.—Carriage, Phila., "Girard Works....dis 50&10 %
Borax.—Best Refined....₩ ℔ 15c
Borers.—Angle, Backus'....dis 30 %
Boring Machines.—Angle....each $4 75
Common, Snell's quality....each 3 75
Braces.—Barber's....dis 40&5 %
Backus'....dis 50 %
Spofford's....dis 50 %
Amidon....dis 50 %
Brackets.—Star Bronzed....new list net
Star Japanned....new list net
Store Shelf....new list net
Brass Faucets.—L. F. & C....dis 25&10 %
Butts.—Union Drilled Loose Joint....dis 45&10 %
" " Wire Fast Joint....dis 25&10 %
" " Acorn Loose Joint....dis 45&10 %
Brass Butts....dis 30 %
Wrought Table Butts and Back Flaps....revised list, dis 30 %
Wrought Narrow Butts....reduced, dis 30 %
Can Openers—Sprague's....dis 50 %
No. 1, Iron Handle....$4·00
No. 2, Wood Handle....4·50
Cards.—
Curry Cards, No. X, per doz., $0·35....dis 30 %
Horse " No. X, " 0·80....dis 30 %
Wool " No. 8X, " 2·50....dis 15 %
Cotton " No. 10, " 3·50....dis 10 %
Cartridges.—U. S. Cartridge Co....dis 60 %
Chisels.—"Buck Bros.' Shank Goods....add 22½ %
Socket....add 25 %
Churns.—Lightning—
Redheffer patent.... 3, 4, 5, 6 gall
per doz $22 00, $27 00, $31 50, $36 00
Coal Hods....dis 40 %
Fancy Japanned, No. 4, 15 in., $8·00; 5, 16 in., $9·00; 6, 17 in., $10·00.
Fancy Galvanized, No. 4, 15 in., $11·50; 5, 16 in., $13·00; 6, 17 in., $14·00.
Perfection, Jap'd, No. 4, 15 in., $12·00; 5, 16 in., $13·00; 6, 17 in., $14·00.
Perfection, Galv'd, No. 4, 15 in., $15·00; 5, 16 in., $16·00; 6, 17 in., $17·00.
Morning Glory, Jap'd, No. 4, 15 in., $12·00; 5, 16 in., $13·00; 6, 17 in., $14·00.
Morning Glory, Galv'd, No. 4, 15 in., $15·00; No. 5, 16 in., $16·00; No. 6, 17 in., $17·00.
Compasses and Dividers.—Bemis'....dis 40 %
P. S. & W....dis 30 %
Cordage.—Manila (usual trade dis.)....₩ ℔, 14½c
American Tarred Hemp Lath Yarn....₩ ℔, 10c
Corn Hooks....per doz $2·75
Cow Ties....dis 10 %

No. 30, Open Ring,	3 foot,	No. 6,	with Toggle	....	$3·70
No. 35, "	3 "	No. 6,	" Snap	....	3·90
No. 40, "	3½ "	No. 6,	" Toggle	....	4·00
No. 45, "	3½ "	No. 6,	" Snap	....	4·30
No. 50, "	4 "	No. 5,	" Toggle	....	4·70
No. 55, "	4 "	No. 5,	" Snap	....	4·80
No. 60, "	4½ "	No. 4,	" Toggle	....	5·20
No. 65, "	4½ "	No. 4,	" Snap	....	5·40

Crow Bars.—Iron, Steel Points....₩ ℔, 5½c
"Sweet" Steel Bars....₩ ℔ 11c
Brown's Steel Bars....₩ ℔ 10c
K. P. & Co. Extra Drill Steel....₩ ℔ 15c
Dividers.—Cook's Nickel Plated....dis 15 %
Door Springs.—Moseley—
Per doz....$9·00, 12·00, 15·00, 18·00, 24·00
No.... 0, 1, 2, 3, 4
Torrey's....$3·00
Gem....1, $3 50; 2, $2 50; 3, $2 00 ₩ doz
Egg Beaters.—Lightning, Redheffer pat., pints, $5 50; 1 qt., $8 00; 2 qts., $12 00 per doz.
Emery.—Alden....₩ ℔ 6½c
Wellington Mills....₩ ℔ 10c
Files.—Earl Smith & Co.'s English....$5 to £ gold
American....$5 to £ currency, less 15 %
Nicholson....new net list
Wheeler, Madden & Clemson....$5 to £
Stubb's Tapers, genuine, 3 in., $1·50; 3½, $1·62; 4, $1·88; 4½, $2·18; 5, $2·50.
Funnel Irons.—$2·50, 2·50, 2·50, 3·25 per doz
5, 5½, 6, 7 inch.
Deep Flange.—$3·50, 3·75, 4·00
5, 5½, 6 inch.
Hammers.—Maydole....dis 12 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1½, $8·75
" " " " " " bell face, No. 1, $11; 1½, $9·75.
Hangers & Rollers.—Novelty....dis 30 %
Anti-Friction....dis 30&5 %
Hatchets.—Underhill Edge Tool Co....dis 15 %
C. F. Dowse, warranted Cast Steel—
Shingling....0, $4·75; 1, $5·25; 2, $5·75
Claw....1, 5·75; 2, 6·25
Lathing....1, $5·50
Axe Pattern....1, $7·00; 2, 7·50
Broad....0, $5·75; 1, $6·50; 2, $7·50; 3, $9·25; 4, $10·75; 5, $12·75; 6, $14·75
Hinges.—Strap and T, Stanley Works....dis 40 %
Plate, Loose and Fast Joint....₩ ℔ 6c
Wrought Screw Hook....₩ ℔ 6½c
Knobs.—Young's Imp. Silverd Glass....dis 45 %
Lanterns.—Tubular No. 0....$ 9·50
Guarded, No. 74, (with kerosene oil and candle burners)....5·50
Anti-Tubular....8·00
Lead.—Sheet, 9½c.; Pipe, 9c....less 10 %
Locks.—Norwalk Lock Co....reduced list, dis 40&5 %
Mattocks.—
K. P. & Co., axe finish, long cutter....$13 00—net
Short cutter....12 75—net
Meat Cutters.—"Miles's" Challenge....dis. 20 %
No. 1, $22·00; 2, $30·00; 3, $40·00.
Metal.—Babbitt, No. 1, 35c; 2, 25c; 3, 18c; 4, 15c ₩ ℔
Nails.—10d and larger....$3 25 net
Nail Pullers.—Little Giant—Small....per doz., $22·00
Little Giant—Large.... " 30·00
Padlocks.—Wilcox....reduced list, dis 40&5 %
All Brass, 2½ inch, 2 keys, job lot....$9 00
Paper.—Tar'd Sheathing....₩ ℔ 2 c
Dry Sheathing.... " 3 c
" " "Beaver Brand" Rosin Sized.... " 3½c
Tar'd " " " .... " 3 c
Felt " " " .... " 4½c
Virginia Cane Fibre....4½c
Picks.—K. P. & Co., Solid Eyes....5 to 6, $9 00; 6 to 7, $9 50
Pins.—Universal Hat and Coat all wood—
2 in....₩ gross $2 50; 3 in., 3 50; 4 in., 4 50—dis 15 %
Potato Digger.—
"Partridge," 6 square tine....₩ doz $12 00
Shumway & Co., 6 round tine....₩ doz 9 00
Pulleys.—Axle.
Frame Pol. Wheel....No. 150, 30c., 1¾ in.; 16, 38c., 2 in.
Common Axle....No. 18, 34c., 1¾ in.; 26, 40c., 2 in.
Milled Axle....No. 2, 42c., 1¾ in.; 3, 50c., 2 in.
Nashua Pat. Axle Bronzed Face...1¾ in., 80c; 2 in., 90c
Cast Steel Axle....2 in., $1·00
Pulley Blocks.—"Best Boston Make"....net
Common Strapped Blocks—

	4	5	6	7 inch.
Single,	75c.	88c.	$1·00	$1·18 each.
Double,	$1·00	1·12	1·25	1·60 "

Inside Iron Strapped Blocks—

	5	6	7	8	9	10 inch.
Single,	$1·00	1·13	1·35	2·00	2·25	2·75 each.
Double,	1·88	2·30	2·68	3·63	4·00	5·00 "

Inside Iron Strapped Blocks, with Patent Roller Bushings—

	5	6	7	8	9	10 inch.
Single,	$1·25	1·50	1·65	2·50	2·75	3·50 each.
Double,	2·50	3·00	3·38	4·63	5·00	6·50 "

Plated Ware.—Rogers Bros....dis 50 %
Plumb & Levels.—"Davis" Pat. Adjustable—
No. 1, Iron and Wood Center Levels....dis 50 %
No. 2, First Quality Levels....dis 60&10 %
No. 3, Iron Pocket " ....dis 35 %
No. 4, Level and Plumb Glasses....dis 60&10 %
No. 5, Iron Pocket Levels, per square and straight edge....dis 50&10 %
No. 6, Improved Iron Bench Planes....dis 20&10 %
Pocket Knives.—Conn. Cutlery Co....new net list
American Shear Co....new net list
Rail Barn Door.—For Novelty and Anti-Friction Hangers....per foot 7c., dis 30 %
Rivets.—Black....dis 50 %
Carriage, oval head, Nos. 3, 4, 5, 6, 7, 8, dis 35 %
13, 13, 14, 14, 15, 16c ₩ ℔
Rubber Moldings.—"Harmon's"....dis 10 %
No. 2, for Windows....per foot, 5c
No. 3, for Doors....per foot, 10c
No. 4, " ....per foot, 12c
Sad Irons.—Bless & Drake....₩ ℔ 4c
Sand Paper—0 to 2, $4·25; 2 to 3, $4·75....dis 10 %
Saws.—*Hand and Panel*—
Wheeler, Madden & Clemson's, same list as "Disston's"....dis. 15&5 %
Disston's....dis. 12½ %
Cross Cut—
Wheeler, Madden & Clemson X Cuts....per ft., 37c
" " " "Star" X Cuts. " 60c
" " " Champion X Cut. " 50c
" " " One Man X Cut..each, $2·25
Boynton's genuine Lightning X Cut....per ft., 50c
" " " One Man X Cut..each, $2·00
Circular—Wheeler, Madden & Clemson's....dis. 25 %
Mill— " " " ....dis. 25 %
Screws.—Am. Screw Co., new list Sept. 1st....dis 40 %
Aiken's....dis 40 %
Scythe Stones.—
"Willoughby Lake," first quality....₩ gross $6·50
" " second quality.... " 3·00
Shovels.—O. Ames....dis 20 %
M. B. & D....dis 20 %
Snow, Malleable Iron Tip, D Handle—Agents for New England....$6·50
Snow, Malleable Iron Tip, long Handle—Agents for New England....5·50
Sifters.—Coal, Rice, &c....$12 00
Spading Forks.—M. & E....dis 25 %
Stone Pickers.—"Partridge," original....₩ doz $15 00
Tools.—Aiken's Pattern, 20 in set; Parr's..$7 50 per doz
Traps.—Oneida....dis 25 %
Blake's....dis 30 %
Vises.—K. P. & Co.'s Solid Box Blacksmith....₩ ℔ 13c
Parker's Parallel....dis 10 %
Backus....dis 25 %
"Howards," Parallel....dis 20 %
Wardrobe Hooks.—Wire to drive....₩ gross $1 00
Weather Strips.—"Harmon's"....per doz $5, dis 10 %
Weights.—Window Weights....₩ ℔ 2c
Wedges—Axe....₩ doz 38c
Wire.—
Eureka, in spools, No. 28 to 40 assorted....₩ gross $8 50
Wire Netting.—Clinton Wire Cloth Co., Green, Drab or Black....₩ ft 5½c
Wrenches.—Genuine Wrenches, G. A. Coes..dis 40&5 %
Walton....dis 50 %
Wringers.—
{Novelty and Universal} Tub No. 2 {....Less than doz, $72 00; ....2 doz or more, 70 00}
Bench A....less than 2 doz $86 00; 2 doz or more $84 00
" B.... " " 94 00 " " 92 00
" C.... " " 110 00 " " 107 00
Eureka.... " " 60 00 " " 58 00
Withington, Cooley & Co.—
Hoes, Rakes, Forks, &c....dis 33⅓ %

Boston Metal Market.

(Corrected by Fuller, Dana & Fitz, 110 North Street, Boston, Importers and Commission Merchants.)

September 1, 1875.

Iron.—Best Refined Bar Iron....₩ ton $57 50
"Burden Best" " .... " 95 00
Swedish Bar Iron....gold " 110 00
Norway Shapes....gold " 122 50
Norway Nail Rods....gold " 130 00
Sheet Iron, American....₩ ℔ 4½c
" " Galvanized.... " 9 c
" " Russian....gold " 18½c
Plate Iron, C. No. 1.... " 3½c
Iron Rails....₩ ton $50 00
Steel Rails.... " 75 00
Pig Iron, Foundry, No. 1 extra.... " 27 00
" " No. 2 extra.... " 25 00
" Gray Forge.... " 23 00
" Scotch.... " 30 00 @ 32 00
Wrought Scrap Iron.... " 31 00
Old Rails.... " 28 00

Steel.—	₩ ℔	German....₩ ℔	9½c
Eng. Tool, gold	15½c	Spring....	8 c
American Tool	14½c	Tire....	6 c
" Mach	9½c	Sleigh Shoe....	4½c
Bessemer....	7 c	Toe Calk....	7½c
Tin Plates.—₩ box gold		**Copper.**—	₩ ℔
I. C. Char. 10x14....	$7·75	Ingot....	23½c
I. C. Coke 10x14....	7 00	Bolt....	30c
Char. Roof. IC, 14x20.	7 25	Sheathing....	30c
Coke " IC, 14x20,	6 25	**Lead.**—	₩ ℔
METALS.		Pig....	7½c
Pig Tin.—₩ ℔., gold		Sheet & Pipe....	$1-10c
Banca....	21c	**Zinc.**—Sheet..₩ ℔	10½c
Straits....	19½c	**Spelter.**....₩ ℔	7½c
English....	19½c	**Antimony.**, gold..₩ ℔	13½c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co.

Apple Parers.—Conqueror....₩ doz, $7 75
Hudson's Rotary.... " 7 75
Axes.—Wm. Mann's, Red Warrior....₩ doz $11 50
Wm. Mann's, W. Stewart's....11 00
" C Marshall....10 50
" Handled.... " $5 extra
" Double Bitted.... " 22 50
H. L. B. & Co.'s, L. & Co.... " 11 50
" Pioneer.... " 12 00
" James & Co.... " 11 00
Hunt's.... " 12 00
Axles.—"Jones, Henry & Co.'s" Patent Lubricating, Half Patent, Swelled Taper, Plain Taper and Concord Axles....dis 10 & 5 %
Common Axles (Pat. Lubricating), 1½ inch and upward....₩ ℔. 6½c.
do. less than 1½ inch.... " 7 c.
Bellows.—Best St. Louis make, 60c ₩ in. dis 20&2½ %
Bells.—Troy, Church, School and Farm Bells..₩ ℔ 42c
"Improved Amalgam Bronzed." 15 in., $8·00; 17 in., $4·00; 19 in., $6·00....net
Belting.—"Boston Belting Co.'s Rubber....dis 40 %
"Bradford & Sharp's" Oak-Tanned Leather....dis 30 %
Bolts.—Arms, Bell & Co.'s Carriage & Tire..dis 70&10 %
Arms, Bell & Co.'s Machine....dis 30&10 %
Butts.—Western Butt Co.'s new list—
Narrow Fast Joint....dis 25&10 %
Broad Fast Joint....dis 35&10 %
" Loose "....dis 45&10 %
Reversible....dis 40&10 %
" Japanned and Silver Tipped....dis 45&10 %
Loose Joint "Acorn"....dis 45&10 %
Wheeling Hinge Co.'s W't Fast Joint Nar....dis 30 %
" " " Broad....dis 35 %
" " Loose Joint....dis 35 %
" " Reversible....dis 35 %
" " Table & B'k Flaps....30 %
Churns.—Julian, No. 2, $7·00; No. 3, $7·50; No. 4, $8·50....dis 25 %
Cider Mills.
American Senior, $40·00; Am. Junior, $25·00....dis 20 %
Corn Knives.—Dunn Edge Tool Co.'s Clip....₩ doz 5 00
Seymour Mfg. Co.'s Solid Steel Back....4 00
Corn Shellers.—Sandwich Mfg. Co.'s—
Power Shellers....dis 10 %
Hand Shellers....Special rates
Cotton Gins.—The Carver, 10 in. Saw, $4 a Saw..dis 15 %
12 in. Saw, $4·50 a Saw....dis 10 %
Crow Bars.—Steel Pointed....₩ ℔ 6½c
Drag Saw Machines.—
Culver's Iron Drag Saw....dis 10 %
Robinson's Patent Sweepstakes Drag Saw....dis 10
Fanning Mills.—Nash & Cutt's....dis 20 %
Feed Cutters.—Improved Burdick National...dis 20 %
Sanford No. 1, $10 75; No. 2, $8 00....net
Files.—Black Diamond, Mill....$5·00 £ currency.
" Bastard....5·00 £ currency.
" Taper....5·00 £ currency.
Forges.—Keystone Portable Forge Co.'s....dis 12½ %
Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks....dis 10 %
" " Handled Hoes....dis 30 %
Garden Seed Drills and Wheel Hoes.
Allen's Double Wheel Hoe....dis 5 %
" Planet Drill, Nos. 2 and 3....dis 15 %
" Combined Drill and Wheel Hoe....dis 15 %
Grinding Mills.—Challenge Feed Mills....dis 15 %
Sedgebeer's Nonpareil Mills....dis 15 %
Hammers.—Masons' Hammers....₩ ℔ 20c
Smiths' Hand....20c
Handles.—No. 1 Fork, Hoe and Rake....dis 20 %
No. 2 Fork, Hoe and Rake....dis 40 %
Harrow Teeth.—1 inch iron....₩ ℔ 4½c
¾ and ⅞ inch iron....4½c
Barbed or Headed....½c extra
Hay and Cotton Presses.—
Dederick's Railroad....nett list
" Perpetual....nett list
Hay Knives.—
Dunn Edge Tool Co.'s....₩ doz $15 00—dis 15&5 %
Lightning (Weymouth's Patent)....₩ doz $20 50
Hinges.—
Wheeling Hinge Co.'s Strap & T....dis 33⅓&10 %
Horse Hay Fork.—Nellis' Harpoon....dis 25 %
Horse Nails.—National Patent Pointed....20c rates
National Patent Pointed, extra finished....22c "
Horse Powers.—Pitts or Carey's Patent....dis 10 %
Wheeler's Railway....dis 10 %
Sandwich Lever....dis 10 %
Horse Rasps.—Heller Bros....dis 45 %
"Black Diamond"....$6·00 to the £ currency
Horse shoes.—
Rhode Island (Perkin's Pattern)....₩ keg, $5 50
" Mule.... " 6 50
" Trotting Shoes.... " 8 00
Tredegar Horse....per keg $5 50
" Mule....per keg 6 50
Hose.—
Boston Belting Co.'s Rubber Medium Sizes, dis 30&10 %
" " " Small Sizes, Hydrant....dis 40 %
Ice Tools.—W. T. Wood & Co.'s Saws....new list net
W. T. Wood & Co.'s Chest Hatchets....new list net
" " Axes....new list net
" " Loading Tongs....new list net
" " Medium, Small and Family Tongs....new list net
" " Chisels, Hooks and Grapples....new list net
Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks....₩ doz $13 00 @ 13
" " Grub Hoes, oval eye.... " 10 00 @ 12 20
Money Drawers.—
Pierpont & Co.'s Excelsior....per doz $40·00 net
Nails.—Wheeling....$3 15 rates
Packing.—Boston Belting Co.'s Rubber, Plain..dis 30 %
Boston Belting Co.'s Rubber, Pure....dis 25&5 %
" " No. 2 Plain....dis 40 %
" " Round and Square....dis 10&10 %
Picks.—Klein, Logan & Co's Railroad and Clay....₩ doz $9 20 @ 11 00
Klein, Logan & Co.'s Coal.... " 7 45 @ 8 40
" " Poll.... " 12 60 @ 15 50
" " Stone.... " 14 40 @ 14 90
" " Tamping.... " 14 75 @ 15 35
" " Miners' Drifting.... " 10 25 @ 12 80
Plows.—Avery's Cast and Steel....dis 20 %
Collins Cast Cast Steel....new list net
Pekin Steel....new list net
Post Hole Augers.—Clark's Patent—
No. 1, ₩ doz. $27; No. 2, $30; No. 3, $32....dis 20 %
Pulleys.—5 inch....per doz $4·25 net
4 inch....per doz 3·25 net
Nellis' Patent....new list dis 15 %
Pumps.
St. Louis, Farm, Patent Metal Lined...new list dis 50 %
Rakes.—Paddock's Premium Sulky....$28 00 net
St. Louis Revolving 14 tooth....4 65 net
" " 16 " ....4 90 net
" Hand Hay Rake....dis 20 %
Reaper Knives and Sections.—
Geo. Barnes & Co.'s Knives....dis 25 %
" " Sections....dis 40 %
Road Scrapers.—Steel....dis 25 %
Cast Iron....dis 10&5 %
Sad Irons.—Monitor Brand, Silver Polished..₩ ℔ 4½c
Sash Weights.—Standard Solid Eyes....₩ ℔ 4c
Saws.—Curtis & Co....dis 10 %
Scythes.—Dunn Edge Tool Co.'s....new list dis 20&5 %
Scythe Stones.—No. 1 Ind'n Pond ₩ gr's, $7 00; Extra Indian Pond " 7 50; Premium " 10 50; Diamond Grit " 13 00—dis 25 %
Shovels and Spades.—H. M. Myers & Co....dis 30 %
Grain Scoops, Pat. Cor'd Straps H. M. M. & Co...dis 30 %
" " " M. Rowland & Co.dis 30 %
" " " O. Ames & Son..dis 20 %
Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished....₩ ℔ 15c
Solid Cast Steel....20c
Snaths and Cradles.—Seymour Mfg. Co.'s..dis 20 %
Sorghum Machinery.—Bell Cane Mills....dis 15 %
Scantlin's Seamless Evaporators....dis 10 %
Springs.—Cleveland Spring Co.'s—
Carriage and Express....dis 12½ %
Blue Seat Springs....dis 15 %
Vises.—Solid Box....₩ ℔ 16c
Wilson Mfg. Co.'s....dis 15 %
Wheelbarrows.—Railroad & Garden....new list net
Wrenches.—Coes' Genuine....dis 33⅓ %
Coes' Pattern....dis 50
Wagons.—Whitewater Farm Wagons—
Thimble Skein....No. 3, $74; 3¼, $78; 3½, $79
Iron Axle....No. 1½, $78; 1¾, $81; 1⅞, $88

St. Louis Metal Market.

(Corrected Weekly by Messrs. R. Sellew & Co.)

Tin Plate.

IC, 10x14, Best Char..	$ 9·50	IX, 14x20, Roofing....	$11·50
IX, 10x14, " ..	12·00	IC, 20x28, "	19·00
IC, 12x12, " ..	10·00	IX, 20x28, "	23·50
IX, 12x12, " ..	12·50	IC, 10x14, Coke..	8·50 @ 9·00
IC, 14x20, " ..	10·00	IC, 14x20, "	9·00
IX, 14x20, " ..	13·00	IC, 10x20, "	14·00
IC, 14x20, Roofing....	9·00		

Usual difference for odd sizes.

Block Tin.
Large Pigs....25c | Bars....27c
Small " L. & F....26c |
Sheet Zinc.
Casks....₩ ℔ 10½c | Sheet....₩ ℔ 11c
Solder.
No. 1, Refined, in bars or plate....16c
No. 2, " " " 15c
Pig Lead....7½c
Sheet Copper.—14 to 100 lbs. Sheets 30x60....31c
10 to 12 lbs., " " and 30x72....32c
6 to 9 lbs., " " 35c
Tinned, 14 and 16 oz. 14x48....32c
Planished, 14 and 16 oz. 14x48....39c
" No. 2, 3 and 9....41c
Copper Bottoms....34c

Sheet Iron.—	Com'n.	Sm'th.	Char'l.	Jun'ta.
No. 16 to 20....	4½c	4½c	6½c	7½c
No. 22 to 24....	4½c	4½c	6½c	7½c
No. 26....	4½c	5 c	6½c	8 c
No. 27....	4½c	5½c	6½c	8½c

Galvanized Iron....dis 30 %
Iron Rivets....dis 25 %
Iron Wire....dis 35 %
Coppered Pail Bail Wire....dis 20 %
Copper Rivets and Burs....dis 20 %
Genuine Russia Iron.
Perfect—No. 9, 10, 11, 12....per lb. 17c
Stained—No. 9, 10, 11, 12....per lb. 16c
Tare 22 lbs to Bdle. For less than 1 Bdle. add 1c. ₩ ℔.
Retinned Stamped Ware....dis 20 %

CHICAGO.

(Reported by Frank Sturges & Co., 72, 74 & 76 Lake St.) September 10, 1875.

Tin Plate.—

10x14, IC, Ch'l. Good.$		14x20, IX, Ch' Best.	$13 00
10x14, IC, " Best.	9 50	14x20, IXX, " "	15 50
10x14, IX, " "	12 00	14x20, IXXX, " "	18 00
12x12, IC, " "	10 00	DC, 100 Plate, " "	9 50
12x12, IX, " "	13 50	DX, " "	12 00
14x20, IC, " "	10 50	DXX, " "	14 50
		DXXX, " "	17 00

Roofing IC, Charcoal, Best....9 00
Roofing IX, Charcoal " 11 50
20x28, IC, Charcoal Roofing, Com....18 00
20x28, IC, " Good....18 50
20x28, IC, " Best....19 00
20x28, IX, " " 23 50
10x14, IC, Coke Plates....8 50 to 8 75
14x20, IC, " ....9 00 to 9 50
10x20, IC, " 14 00
Block Tin.—
Large Pigs....27c | Bars....29c
Small....28c |
Zinc.—Sheet, 500 to 1000 lb. Casks....10½c
Loose Sheets....11c
Slab Zinc or Spelter....7½c
Copper.—Bottoms....34c
Sheathing....32c
Planished....39c
" Boiler lengths....41c
Ingot....—
Bolt....35c
Braziers' Sheets.—
30x60, 6 & 7 lbs....₩ ℔ 39c | 30x60, 10 & 12 lbs...₩ ℔ 35c
30x60, 8 & 9 lbs.... " 37c | 30x60, 15 to 100 lbs. " 32c
Solder.—F. S. & Co.'s make.
Best Fine....20c
No. 1....19c
Roofing....17c
Braziers' or Spelter Solder....35c
Antimony....15c
Babbit Metal—F. S. & Co.'s....16c
No. 2....14c
Sheet Iron.—

	Common.	Smooth. Com.	Smooth Charcoal.	Smooth Juniata.
No. 24....	4½c	5½c	6½c	8½c
25 & 26....	4½c	5½c	7 c	9 c
27....	4½c	6 c	7½c	9½c

Galvanized Iron....dis 30 %
No. 16 to 20....14c | No. 27....15c
21 to 24....13c | 28....16c
25 & 26....14c |
Russia Iron.—
Perfect....17c | No. 1 Stained....16c
| In Sheets, 1c. higher.
American Russia.—
A....14c | B....11c
| In sheets, 1c higher.
Lead.—
Pig....7½c | Lead Pipe, in full coils 8½c
Bar....8½c | Lead Pipe, when cut..8½c
| Sheet Lead....9½c
Wire—Bright....dis 25
Coppered....dis 25

TO ALL WHO USE STEAM-POWER!

We will put our Governor on any Engine, and guarantee it to prove itself superior to all others.

If, after a fair trial, it does not, we will take it off at our own expense.

Shive Governor Co

BETHLEHEM, PA.

ALSO,

SHIVE'S PATENT WATCHMAN'S CLOCK AND DETECTOR,

AND

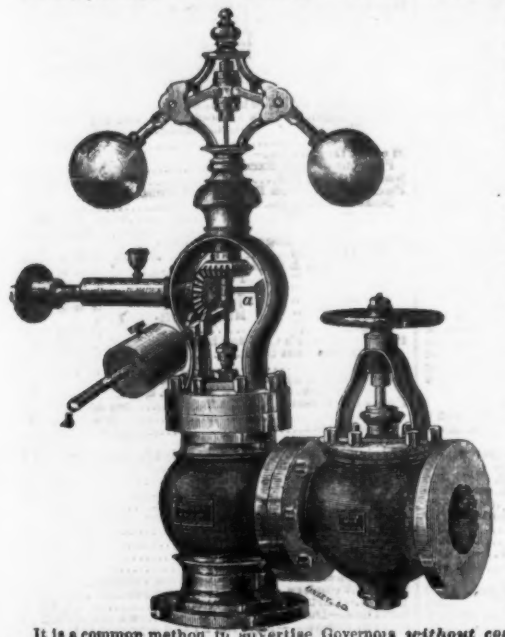
Buoy's Patent Counter Scale,

No Nest of Weights.

Circulars sent free

February 10, 1875. REDUCED PRICE LIST OF THE

JUDSON PATENT IMPROVED GOVERNORS.



☞ When Governors are ordered, be particular and say Governor with Stop Valve, or without Stop Valve; and either Black, Finished or Portable, as you may require, and with or without Lever Attachment.

For dimensions and other particulars send for Illustrated List.

Capacity of Valve or Diameter of Steam Pipe in Inches.	Price, Black.	Price, Bright Finish.	Price, Portable.	Price of Lever Attachment, for altering speed.	Price of Stop Valve.
¼	18·00	20·00	17·00	..	..
⅜	20·00	22·00	19·00	..	..
1	24·00	27·00	22·00	2·00	5·25
1¼	29·00	32·00	27·00	2·25	6·64
1½	34·00	38·00	31·50	2·50	8·50
2	41·00	46·00	38·00	2·75	11·50
2¼	47·00	54·00	..	3·25	16·00
2½	50·00	57·00	47·00	3·50	17·00
2¾	55·00	62·00		3·75	19·00
3	62·00	70·00		4·25	22·00
3¼	71·00	80·00		4·50	27·00
4	81·00	92·00		5·00	32·00
4¼	91·00	103·00		5·50	37·00
5	102·00	114·00		6·00	42·00
5¼	116·00	129·00		6·50	48·00
6	134·00	148·00		7·00	55·00
7	160·00	176·00		8·00	69·00
8	199·00	219·00		9·00	83·00
9	230·00	255·00		10·00	..

No Larger Portable made than 2½ in.

No Charge for Boxing & Cartage.

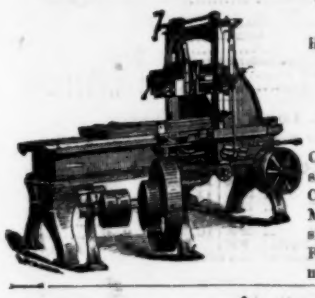
It is a common method to advertise Governors *without cost*, unless satisfactory to the customer, and then charge *High Prices* for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the above list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

JUNIUS JUDSON & SON, Rochester, N. Y.

The Pratt & Whitney Co.,

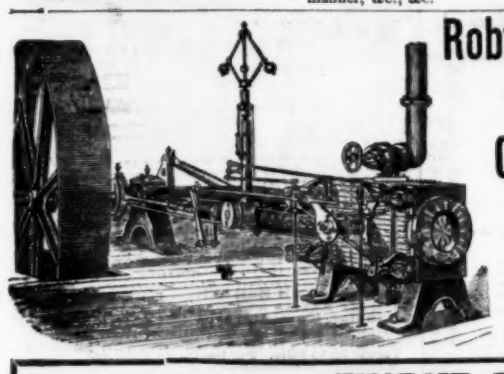
Hartford, Conn.,

Have constantly on hand and making



Drop Hammers

Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.



Robt. Wetherill & Co

CHESTER, PA.

Corliss Engine BUILDERS

AND

Boiler Makers.

THORNE, DeHAVEN & CO.

21st Street, above Market,
PHILADELPHIA.

DRILLING MACHINES.

PORTABLE DRILLS. Driven by power in any direction, self-feed and convenient adjustment.

RADIAL DRILLS. Self-feed—large adjustable box table—separate base plate, every convenience.

VERTICAL DRILLS. Self-feeding—of new and improved designs.

MULTIPLE DRILLS. For boiler work, etc., 2 to 20 spindles, fed and returned by power or hand, together or separately.

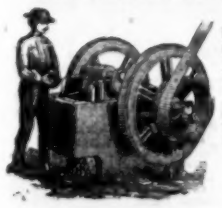
HORIZONTAL BORING AND DRILLING MACHINES. For large pieces—with boring head, adjustable, vertically and horizontally.

SPECIAL DRILLS. For special work. Gun Blank Drills, Coal Drills, &c., built to order.

BLAKE'S PATENT

STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength



For reducing to fragments all kinds of hard and brittle substances, such as STONE for making the most perfect McADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS It is extensively in use in MINING operations, for crushing

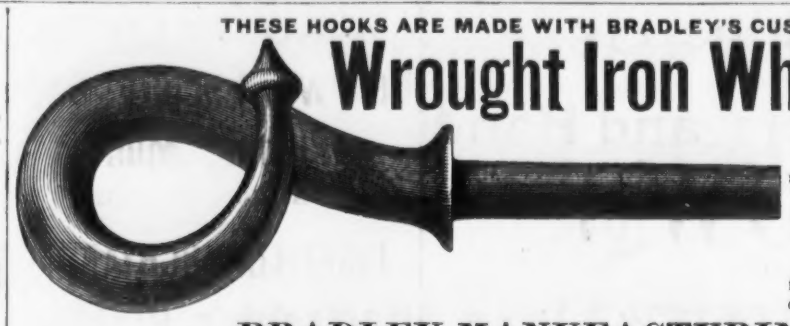
IRON, COPPER, ZINC, SILVER, GOLD, and other ORES.

Also for crushing **Quartz, Flint, Emery, Corundum, Feldspar, Coal, Barytes, Manganese, Phosphate Rock, Plaster, Soapstone, &c.**

For Illustrated Circulars, and particulars, address,

BLAKE CRUSHER CO., New Haven, Conn.

THESE HOOKS ARE MADE WITH BRADLEY'S CUSHIONED HAMMER.



Wrought Iron Whiffletree Hooks.

We are ready to fill orders for Manufacturers or Dealers, and will quote the above Hooks, made of

BEST AMERICAN REFINED IRON,

At 10 cents per lb. Net cash.

Hooks will count out about four to a pound. We can furnish them any desired length of shank and in any quantity.

BRADLEY MANUFACTURING CO., Syracuse, N. Y.

Knowles Patent Steam Pumps

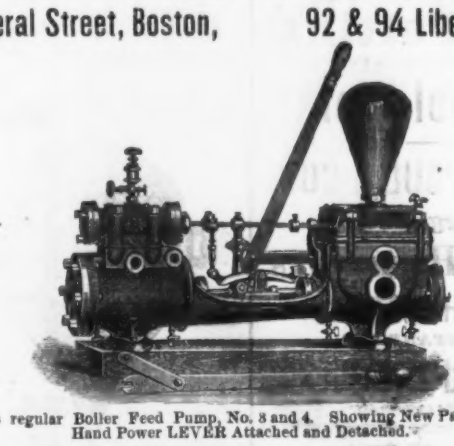
MANUFACTURED BY THE

KNOWLES STEAM PUMP WORKS,

WARREN, MASS.

WAREHOUSES:

14 & 16 Federal Street, Boston, 92 & 94 Liberty Street, N. Y.



Cut above represents regular Boiler Feed Pump, No. 8 and 4. Showing New Patent Valve Motion, and Hand Power LEVER Attached and Detached.

FIRE PUMPS, a specialty.

Mining Pumps (both Double Acting Plunger, and Piston Pattern,) which we guarantee to run absolutely noiseless on any lift from 100 to 600 ft., at a single lift, a specialty. Pumps for every possible duty. Prices as low as any, and our workmanship and material altogether the Best.

Every machine furnished under a complete guarantee.

Morse Twist Drill and Machine Company,

New Bedford, Mass.

Sole Manufacturers of

MORSE PATENT STRAIGHT-LIP INCREASE TWIST DRILL.

Beach's Patent Self-Centering Chuck.

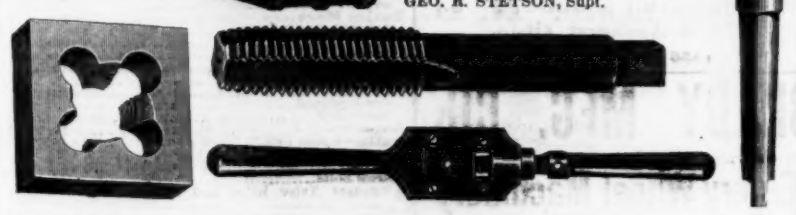
Also Manufacture **Patent Taps and Dies, Patent Screw Plates, Patent Tap Wrenches, Pipe Taps and Pipe Reamers, Gas Dies.**

SOLID AND SHELL REAMERS.

All Tools exact to Whitworth's Standard Gauge.

Drills made to fit any Socket desired.

EDWARD S. TABER, Treas.
GEO. R. STETSON, Supt.



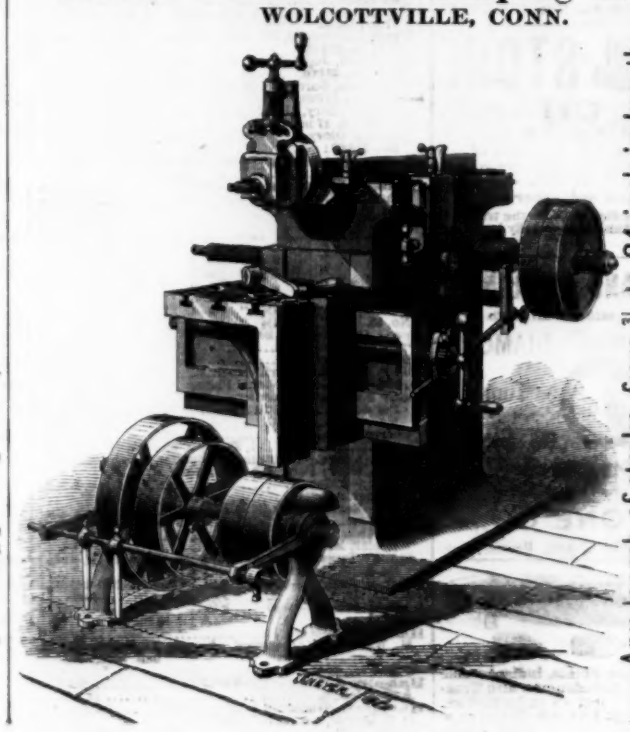
THE HENDEY MACHINE CO.

MANUFACTURERS OF

THE MANVILLE

Patent Planers and Shaping Machines.

WOLCOTTVILLE, CONN.

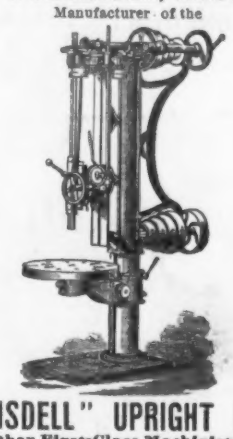


Any length of stroke from ¾ to 24 inch in length, while machine is running with perfect uniformity of speed of cutting tool. Automatic cross feed of 19 inch and 16 inch, from top of table to bottom of slide when table is down. Send for Circular and Price List.

P. BLAISDELL & CO.,

WORCESTER, MASS,

Manufacturer of the



"BLAISDELL" UPRIGHT DRILLS,

And other First-Class Machinists' Tools.

The Frazer Axle Grease and Lubricator.

A pure Lubricator, free from water, gum or sediment. The best article made for ***Wagons, Open Journals, Cog Wheels Rollers*** and wherever a ***Solid Lubricator*** or ***Grease*** can be applied. Put up in Boxes, Kegs and Barrels. For prices see New York Price List in this paper.

Established 10 years.

Frazer Lubricator Company,
104 Maiden Lane, New York.

IMPROVED

Engine Lathes

SCREW MACHINES, &c.

JONES, LAMSON & CO.,

Windsor, Vt.

The Whitmore Engine.

SAFEST, CHEAPEST & BEST.

Lovegrove & Co.,

No. 121 South Fourth Street,
PHILADELPHIA, PA.
Sole Manufacturers
Engines, Boilers and Steam Pumps.

PYROMETERS

for BLAST FURNACES.

E. BROWN'S STANDARD PORTABLE,

E. Brown's Improved Gauntlet

Edw. BROWN,

311 Walnut St., Philadelphia.

ALSO FOR SALE

PYROMETERS

For Baker's Ovens, Boiler Flues, Galvanizing Baths, Oil Stills, Vulcanizers, Superheated Steam.

Over 300 "Gauntlett" and 100 Portable Pyrometers are now in use at Blast Furnaces.

E. Brown's Portable Blast Gauge for the plug hole, Steam Gauges, Blast Gauges, Mercury Gauges, Recording Steam Gauges, Engine Counters, Indicators for ascertaining the Horse Power.

ALSO,

REVOLUTION INDICATORS.

The Revolution Indicator is driven like a governor, either from a horizontal or vertical shaft; it constantly indicates, without the use of a watch, the number of turns per minute made by a Steam Engine.

There are many engines which have to run at varying speeds for different operations, also engines controlled entirely by hand. For such, the Revolution Indicator will be found particularly useful.

Circulars on application.

Machinery, &c.

THE

Shapley Engine

Patented Feb. 10, 1874.

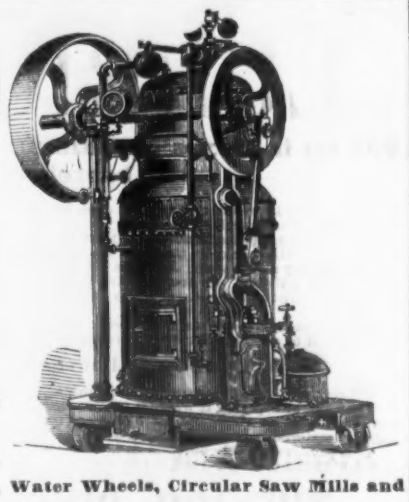
COMPACT,
PRACTICAL,
DURABLE,
ECONOMICAL.

$200·00.

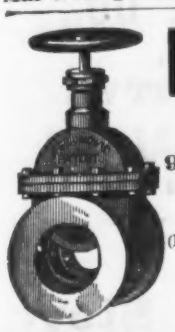
Cheaper than any Engine offered of the same capacity.

MANUFACTURED BY

SHAPLEY & WELLS,
Binghamton Iron Works,
Binghamton, N. Y.



Manufacturers of **Steam Engines, Boilers, Water Wheels, Circular Saw Mills and Mill Work generally.**



Ludlow Valve Mfg. Co.,

OFFICE AND WORKS:

938 to 954 River St. & 67 to 83 Vail Ave., Troy, N. Y.,

VALVES

(Double and Single Gate, ¼ in. to 48 in.—outside and inside Screws, Indicator, &c.) for Gas, Water and Steam. Send for Circular.

Also FIRE HYDRANTS.

Cor. N. 15 St. & Pennsylvania Ave., Phila.

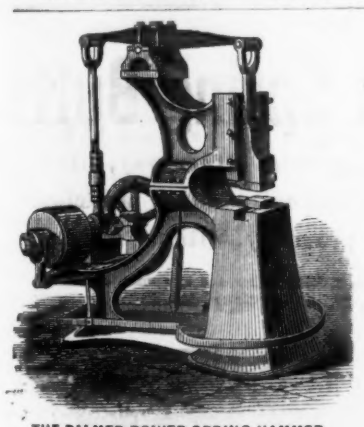
E. HARRINGTON & SON,

Manufacturers of

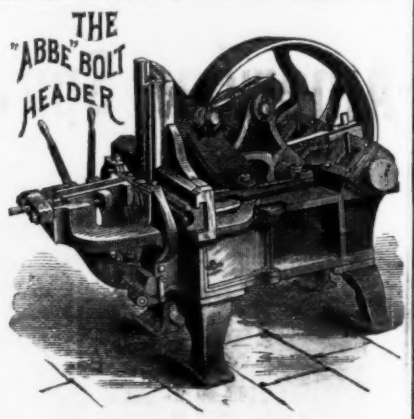
ENGINE LATHES,

From twelve (12) to forty-eight (48) inches swing;

Hand Lathes; Wood Turning Lathes; Vertical Drills; Boring Mills; Tapping and Centering Machines; Screw Press for Mandrels Grindstone Boxes.



THE PALMER POWER SPRING HAMMER.



Of these Machines we are building sizes to meet the requirements of all Manufacturers and Workers of Iron and Steel. In simplicity, durability, ease of operation, accuracy, and range of work, we guarantee them superior to any Machines of their kind produced in the world. For prices, references, and full descriptive circulars, address

S. C. FORSAITH & CO.,

Manchester. N. H.

WILSON MANUFACTURING COMPANY.,

NEW LONDON, CONN.

MANUFACTURERS OF

SOLID BOX VISES.

With or without Convex and Concave Washers.

Jackscrews, Braces, Coffee Mills, Turning Lathes; Clamp Heads and Screws; Parallel Bench Vises, Sash Pullies, Hoi House Pullies, Composition Cocks, Bench Screws, Vise Screws, Gridirons, Drill Stocks and Bows, Box Chisels, Rivets, Sheaves, Block Pins, Composition Roller and Iron Bushings, Riggers' Screws, Caulkers' Tools, Pump Chambers, Belaying Pins, Marlin Spikes, Malleable Iron Castings, and General Hardware.

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RICHARD DUDGEON,

No. 24 Columbia Street, New York,

MAKER AND PATENTEE OF

Hydraulic Jacks and Punches,

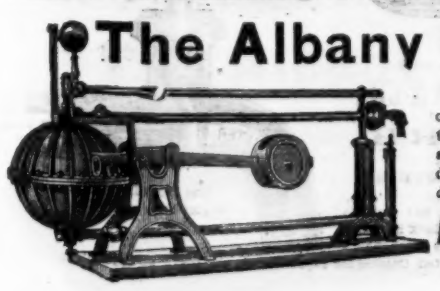
ROLLER TUBE EXPANDERS

And Direct-Acting Steam Hammers.

Communications by letter will receive prompt attention.

JACKS for Pressing on Car Wheels or CRANK PINS made to order

The Albany Steam Trap.



This Trap automatically drains the water of condensation from *Heating Coils*, and returns the same to the Boiler *whether* the Coils are *above or below* the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

Albany Steam Trap Company,
Albany, N. Y.

Machinery, &c.

Established 1848.

WM. SELLERS & CO.,

1600 Hamilton Street, PHILADELPHIA.,

Engineers, Iron Founders and Machinists.

RAILWAY SHOP EQUIPMENTS.

Our Steam Hammers, Lathes, Planers, Drills and Bolt Cutters

Are of Improved and Patented Construction.

Railway Turning and Transfer Tables,

SHAFTING & MILL GEARING, a specialty.

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FAIRMOUNT MACHINE WORKS,
Office, 2106 WOOD St., Philadelphia.
Manufactures as Specialties

POWER LOOMS,
SPOOLING, BEAMING, DYEING and Sizing Machines.
PATENT BOBBIN WINDING MACHINES
wind direct from
hank or skein to shuttle bobbin.

SHAFTING

With Patent Adjustable self-oiling Bearings.
Adjustable Self-Oiling Hangers,
8, 10, 12, 15 and 18 in. drop,
Ball and Socket Self-Oiling Pillow Blocks.
Pulleys, from 4 inch to 10 feet in diameter.
Pulleys made in two parts, any size required.
SELF-ACTING WOOL-SCOURING MACHINES,
LARD AND PARAFFINE OIL PRESSES.
Improved Power Hoisting Machines.
Machine and Foundry Work in all their branches.
Plans taken, and Factories fitted out complete with shafting and Gearing
Send for list of Pulleys, &c.
THOMAS WOOD.

HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO.

Issues Policies of Insurance after a careful Inspection of the Boilers

COVERING ALL LOSS OR DAMAGE TO

Boilers, Buildings and Machinery,

ARISING FROM

STEAM BOILER EXPLOSIONS.

The Business of the Company includes all kinds of STEAM BOILERS

Full information concerning the plan of the Company's operations can be obtained at the

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STATIONARY & PORTABLE

STEAM ENGINES,

The best and Most Complete Assortment in the Market.

These Engines have always maintained the very highest standard of excellence. We make the manufacture of Engines, Boilers and Saw Mills a specialty. We have the largest and most complete works in the country, with machinery specially adapted to the work.

We keep constantly in process large numbers of Engines, which we furnish at the very lowest prices and on the shortest notice. We build Engines specially adapted to Mines, Saw Mills, Grist Mills, Tanneries, Cotton Gins, Threshers and all classes of manufacturing.

We are now building the celebrated Lane Circular Saw Mill, the best and most complete saw mill ever invented.

We make the manufacture of Saw Mill Outfits a special feature of our business, and can furnish complete on the shortest notice.

Our aim in all cases is to furnish the best machinery in the market, and work absolutely unequalled for design, economy and strength.

Send for Circular and Price List.

UTICA STEAM ENGINE CO.,
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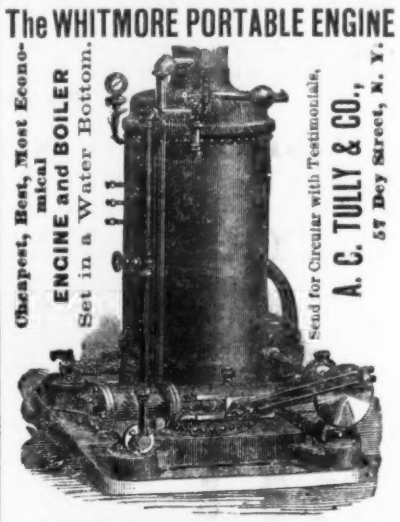
The WHITMORE PORTABLE ENGINE

Cheapest, Best, Most Economical ENGINE and BOILER Set in a Water Bottom.



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57 Dey Street, N. Y.

LATHES, PLANERS,

and other

Machinists' Tools.

For Sale by

New Haven Mfg. Co.,

NEW HAVEN, CONN.

MINERS' CANDLES.

Superior to any other Light for Mining Purposes. Manufactured by

JAMES BOYD'S SONS,
Nos. 10 & 12 Franklin St., N. Y

JOHNSON'S PATENT UNIVERSAL LATHE CHUCK.

We invite attention to the superior construction of this chuck. Its working parts are **absolutely protected from dirt and chips.** It is strong, compact and durable, and will hold the greatest variety of work, as the jaws are adjustable with a range the full diameter of the chuck. For Price List address,

Lambertville Iron Works, Lambertville, N.

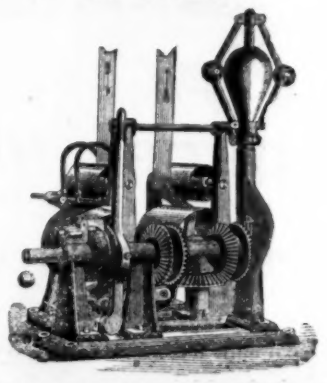
DIFFERENTIAL GOVERNOR.

The HARTFORD GOVERNOR CO.,

Sole makers of the

Weaver Differential Governor,

FOR WATER.



Powerful, positive, radically new. Introduced and working with complete success. Write us for circular, etc., at

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TUBAL SMELTING WORKS,

760 South Broad Street, PHILADELPHIA.

PAUL S. REEVES,

MANUFACTURER OF

ANTI-FRICTION METALS.

XXX Genuine	40c	C	20c
XX	38c	D	15c
X	35c	E	13c
A	30c	F	11c
B	25c		

"Note."—The above are my standard mixtures, and have given satisfaction wherever used, but I am prepared to make Anti-Friction Metal of any quality or mixture desired by the purchaser.

BRASS CASTINGS, 21 to 35c. | **INGOT BRASS,** 19 to 28c. | **BRASS TURNINGS AND OLD METALS WANTED.**

ESTABLISHED 1842.

WM. & HARVEY ROWLAND,

PHILADELPHIA,

P. O. Address: Frankford, Philad'a. | MANUFACTURERS OF ALL KINDS OF

Elliptic, Platform AND C Springs,

MADE EXCLUSIVELY FROM

SWEDISH STOCK, OIL-TEMPERED and WARRANTED.

Swedish Tire, Toe, Blister and Spring Steel.

CAST SPRING AND PLOW STEEL.
CAST SHOVEL, HOE AND MACHINERY STEEL.

OXFORD TOE, SLEIGH, TIRE AND SPRING STEEL.
BESSEMER SHOVEL AND PLOW STEEL.
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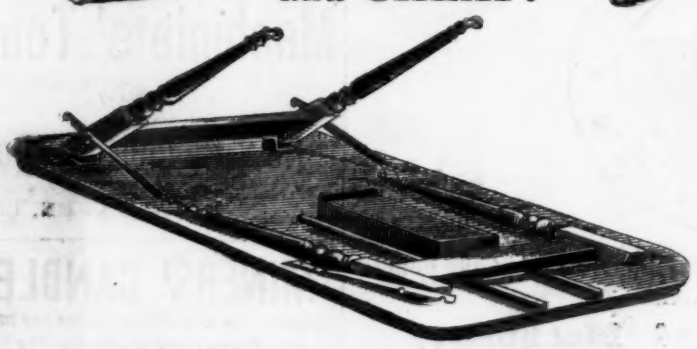
RE-ROLLED NORWAY SHAPES.
NORWAY NAIL RODS ROLLED AND SLIT FROM SUPERIOR BRANDS.

MAIRS' PORTABLE TABLE.

FIRM, DURABLE and CHEAP.



LARGE DRAWER ALWAYS SECURE.

YARD MEASURE, and Folds like a Pocket Knife. Agents wanted. Terms liberal.

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THE NATIONAL STEEL TUBE CLEANER.

Patented July 28, 1874.

Guaranteed to clean better, last longer & work easier than any in the market.

REMOVES ALL

Carbon and Scale from the Boiler Tubes.

ADOPTED AND IN USE BY UNITED STATES NAVY.

For sale by dealers.

THE CHALMERS SPENCE CO. Foot of East 9th St., New York, Agents for the United States.

Ausable Horse Nail Co.,

MANUFACTURERS OF

HAMMERED,

Hammer Pointed, Polished & Blued

HORSE NAILS,

FROM

BENZON IRON.

Orders promptly filled at lowest market rates.

ABRAHAM BUSSING, Secretary,
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GLOBE NAIL COMPANY,

MANUFACTURERS OF

Pointed, Polished & Finished Horse Shoe Nails.

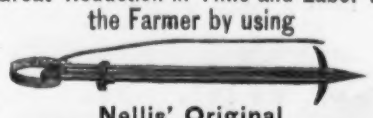
Recommended by over 20,000 Horse Shoers.

All nails made from best NORWAY IRON, and warranted perfect and ready for driving. Orders filled promptly and at lowest rates by

GLOBE NAIL CO., Boston, Mass.

NEW TIME TABLE.

Great Reduction in Time and Labor to the Farmer by using



Nellis' Original

HARPOON HORSE HAY FORK,

Nellis' Grapple.

Grapple and Pulleys; also, Nellis' Patent Stacker and Method of conveying Hay, Straw, &c. A ton of Hay can be delivered in three to five minutes to any part of Mow or Stack. The right of Stacker and Conveyer granted FREE to the Farmer purchasing our Horse Hay Fork and Fixtures during season of 1875.

With it Pulleys can be attached or detached to rafter or beam, without the use of a ladder.

NELLIS' PULLEY,

Improved Wrought Frame, Prepared Wood Wheel. Warranted superior to any Horse Fork Pulley offered in the market.

A trial of these goods will convince any farmer that he cannot afford to dispense with them, as their entire cost is often times saved by a single day's use.

Also manufacturers of all descriptions

Of Agricultural Steel & Iron,

Steel Tempered by Nellis' process to suit every kind of soil.

Prices and descriptive Catalogues of our goods furnished free. Address,

A. J. NELLIS & CO.,
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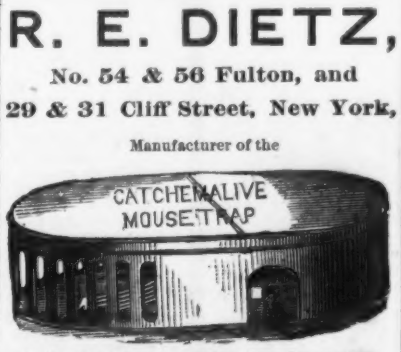
SEMPLE, BIRGE & CO., St. Louis, Mo., General Agents for the Southwest.

ESTABLISHED 1840.

R. E. DIETZ,

No. 54 & 56 Fulton, and
29 & 31 Cliff Street, New York,

Manufacturer of the



Each mouse caught resets the Trap for another.

TUBULAR

And Other

Patent Lanterns

BRASS AND IRON

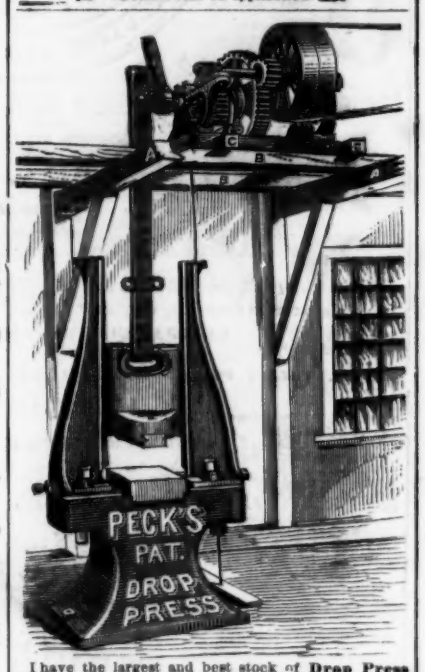
Jack Chains.

STANLEY G. FLAGG & CO.

PHILADELPHIA, PA,
Office and Warehouse,
No. 216 & 218 N. THIRD ST.
Manufacturers of

STEEL CASTINGS.

A Substitute for Steel and Wrought Forgings.
☞ Circulars sent on application.



I have the largest and best stock of **Drop Press Patterns** in the country—suitable for Forging, and all kinds of Sheet Metal work.

WHY THE BEST:

It requires less power, works faster, gives a harder blow with same weight of hammer, the rebound of the hammer is caught without lessening the force of the blow, the blow is uniform and not affected by variations in the speed of the driver. It is always in order. **The Drop Press a specialty.**

MILO PECK, New Haven, Conn.

GAS FIXTURES.

Lamps, Bronzes,

Equal to any made, in great variety, all of our own manufacture.

BRADLEY & HUBBARD MFG. CO.,

SALESROOMS:
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SCRANTON

Brass Works,

J. M. EYERHART,

Manufacturer of Brass Work for Water, Gas and Steam. Brass Castings and Jobbing promptly attended

SCRANTON, PA.

DIXON'S PURE PLUMBAGO FOR LUBRICATING.

Put up in Boxes containing 5, 10, 25 and 50 lbs. and in barrels of 200 lbs.

This article is prepared with great care, has more body than that prepared by any other party, and is as near perfect as possible.

We were the first manufacturers to put up Plumbago as a Lubricator; and the experience of years has shown that it will save more than half the expense of oil or grease, will absolutely cool off a hot journal, and save nearly all the wear, the axles or shafts being glazed over with it, and running almost without wear. A car axle will run four or five times as long if our Lubricating Plumbago is used freely. A second-class article, however, is worse than none, because it contains a grit that will wear both the shaft and the box.

If Engineers, Experts and Purchasing Agents knew how much wear and power would be saved by its use, no shaft or axle would revolve without it; every shop and car would have it at hand.

The Journal of the Franklin Institute says:

"Every one knows that for heavy machinery plumbago is a good lubricant, but every one does not always think of applying it where it would serve best. It may be of value to some of our readers to know that a planer whose bed-plate required the force of eight men to slide it when lubricated with the best ordinary material, was easily shifted with one hand when plumbago of good quality was applied."

It is pure, very finely pulverized, is free from grit, and is prepared by the most expert manufacturers of **PLUMBAGO GOODS** in the world. Send for envelope sample.

THE JOS. DIXON CRUCIBLE CO.,

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237, 239, 241 and 243 Railroad Ave., 250, 252, 254 and 256 Wayne Street, | JERSEY CITY, N. J.

Russell, Burdsall & Ward,

PORT CHESTER, N. Y.

Manufacturers of

Carriage, Tire, Plow, Stove

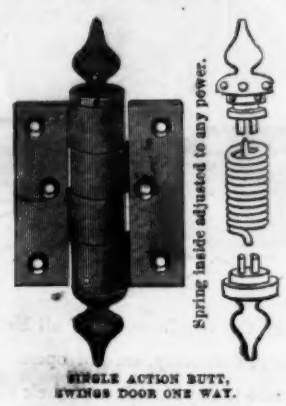
AND OTHER

BOLTS.

Carriage Bolts made from Best Square Iron, a Specialty.

THE

American Spiral Spring Butts



SINGLE ACTION BUTT, SWINGS DOOR ONE WAY.

Very Desirable

FOR

Stores, Banks & Churches,

AND ALL

Outside Winter Doors.

Used on the

National Capitol,
Patent Office,
Treasury,
Plymouth Church,
A. T. Stewart's Stores,
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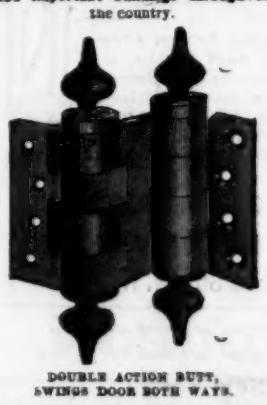
and important buildings throughout the country.



DOUBLE ACTION BUTT, SWINGS DOOR BOTH WAYS.

Swing doors either way, allowing continual passing, and close them promptly, without noise.

Invaluable in cold weather, and in summer can be used as ordinary hinge

Noiseless Double Action Butt, as seen upon a door, swinging it both ways.

PRICE LIST OF MAY 1st, 1875.

Single Action.			Double Action.		
4 in. No. 4, ₩ pair	$ 2 00		3 in. No. 45, ₩ pair	$ 3 00	
5 " 11, "	3 00		4 " 50, "		4 50
6 " 16, "	4 00		6 " 52, "		6 50
7 " 22, "	5 00		7 " 54, "		9 00
8 " 25, "	6 00		8 " 58, "		12 00
10 " 30, "	8 00		10 " 59, "		14 00
10 " 31, "	8 00		10 " 60, "		15 00
12 " 36, "	10 00		12 " 62, "		18 00

Send for Descriptive Circular and Price List.

AMERICAN SPIRAL SPRING BUTT CO., 82 Beekman Street, N. Y.

DERBY SILVER CO., Derby, Conn.,

Manufacture the most reliable

SILVER PLATED SPOONS & FORKS.

They are plated by weight, and not by time or guess, containing 20 per cent. more silver than the usual standard, on a base of Nickel Silver, and finished by hand. Each article is guaranteed by the trade mark and warranted to give full satisfaction. We ask of the trade a fair and impartial test, assuring them that the high standard already attained, shall be maintained. Send for Catalogue and Price.

Schofield's Pat. Gauge Cock.

HENRY C. MEYER & CO.,

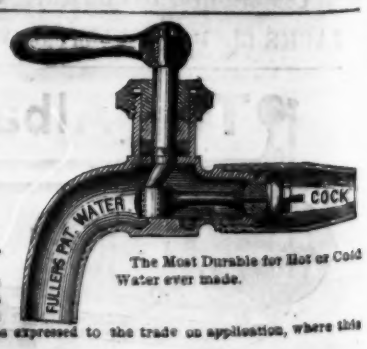
Manufacturers of

BRASS WORK

For Water, Gas and Steam.

Importers and Dealers in PLUMBERS' MATERIALS,
46 & 48 Cliff Street, N. Y.

Specialties manufactured and controlled by us: Fuller's Patent Faucets and Mineral Water Cocks; Murdock Hydrants and Street Washers; Flower's Open Way Valves; Schofield's Gauge Cocks; Hall's Lock Gas Cocks. Illustrated Catalogues expressed to the trade on application, where this advertisement is referred to.



The Most Durable for Hot or Cold Water ever made.